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STAGE III DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STAT--ETC(U)
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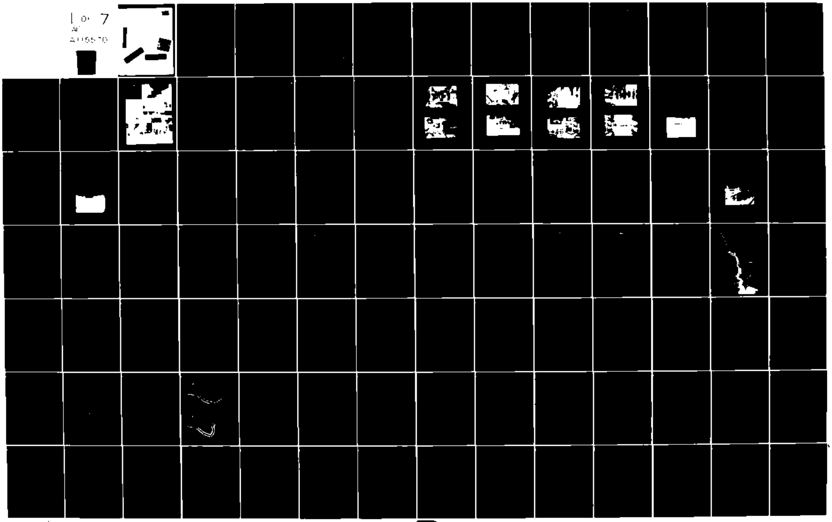

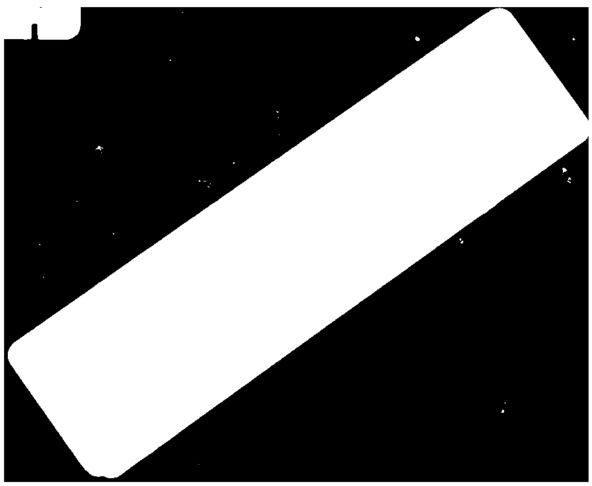

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

flood damage reduction
Conesus Lake

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The report presents a recommended flood damage reduction project on the Conesus Lake outlet (Conesus Creek, N.Y.). Flooding of the Lake's perimeter has generally occured in the spring, although the worst flood of record occurred in June 1972 as a result of Tropical Storm Agnes.

The selected plan recommends constructing a new control structure, improving the outlet channel, and utilizing the natural storage capacity of the Lake. With this combination of structural improvements and lake level

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regulation, the project would protect against a flood which could be expected to occur once in 25 years.

Syllabus

The District Engineer finds a need for the construction of a flood damage reduction project on the Conesus Lake outlet (Conesus Creek). Flooding of the lake's perimeter has generally occurred in the spring although the worst flood of record occurred in June 1972 as a result of Tropical Storm Agnes.

The selected plan recommends constructing a new control structure, improving the outlet channel, and utilizing the natural storage capacity of the lake. With this combination of structural improvements and lake level regulation, the project would protect against a flood which could be expected to occur once in 25 years.

Construction of the project is engineeringly and economically feasible with an estimated first cost of $815,000. The average annual flood control benefits attributed to the project are $118,400. The annual cost of the project is $73,900 and the benefit-to-cost ratio is 1.6 to 1.0.

Local interests strongly support the project and have shown a willingness to assume the non-Federal responsibilities.

DETAILED PROJECT REPORT
FOR
CONESUS LAKE, NEW YORK

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (Cont'd)

LIST OF PLATES

APPENDICES

DETAILED PROJECT REPORT ON CONESUS LAKE

THE STUDY AND REPORT

PURPOSE AND AUTHORITY

This report presents the results of an investigation of flood problems on Conesus Lake to determine the need and scope of Federal participation in alleviating them. A map of the Conesus Lake watershed is shown on Plate 1, Appendix A. This report is submitted under the authority of Section 205 of the 1948 Flood Control Act, as amended, and the Corps North Central Division's (NCDPD-PF) 1st Indorsement of Buffalo District's 26 April 1977 letter transmitting the Reconnaissance Report recommending Federal interest. This authority limits the total Federal cost of this project to $2 million. This includes all the study costs. It does not include any costs which are the responsibility of the local cooperator.

SCOPE OF STUDY

This investigation was directed toward determining the extent of flood protection which would provide the most benefit for the least cost and be environmentally and socially acceptable. In conjunction with the flood management study, the needs of recreation and conservation were considered. The study area is limited to the Conesus Lake Basin and downstream on Conesus Creek (outlet) to the Route 256 bridge.

STUDY PARTICIPANTS AND COORDINATION

The Corps of Engineers has the principal responsibility for conducting the study. This includes compiling the information, evaluating alternatives, assessing the impacts, and preparing the report. The New York State Department of Environmental Conservation (NYSDEC) has been the lead non-Federal agency for the study. In addition, by State law, NYSDEC is the local cooperator on all Federal flood-control projects within the State. NYSDEC's Region 8 office, located in Avon, NY, has been closely involved with the study process. The Conesus Lake Homeowners Association has provided extensive assistance by compiling damages, photos, and numerous pieces of information. Other participants in the study have been: the Livingston County Planning Board, the towns of Geneseo, Groveland, Livonia, and Conesus, and numerous public officials.

U.S. Fish and Wildlife prepared a Final Coordination Act Report on the effects of the proposed plan of improvement on fish and wildlife resources in the area. It is included with relevant correspondence in Appendix F.

On 25 October 1979, a public meeting was held to present alternative plans to control flooding on Conesus Lake. Since that meeting, three newsletters have been published to keep meeting attendees and other interested parties informed of the study developments. Copies of the newsletters are also included in Appendix F.

PRIOR STUDIES AND REPORTS

Several studies in the Conesus Lake Basin have been prepared by various agencies. These studies provide information on water and related land resources problems that assisted us in developing the plan recommended by the report. A summary of pertinent prior studies follows:

Section 205 Reconnaissance Report on Flooding of Conesus Lake, NY, by U.S. Army Engineer District, Buffalo, 26 April 1977; states the problems and identifies that there was a Federal interest.

Flood Insurance Study, in the towns of Conesus, Livonia, Groveland, and Geneseo, by Federal Insurance Administration, report delineates the flood boundaries and profiles along with outlining flood plain management and flood insurance procedures.

Conesus Lake Levels, by New York State Department of Environmental Conservation in the early 1970's, the purpose of the report was to identify the present water uses of Conesus Lake and to find whether it can meet the future projected needs. Only flood control, water supply, water quality, and recreation aspects are considered in this report.

Biological Studies of Conesus Lake and Tributaries, by Environmental Resource Associates, March 1980. Study was conducted by U.S. Army Engineer District, Buffalo, in cooperation with NYSDEC. Two general objectives were considered in relation to biological studies. The first was to provide data and recommendations concerning the elevation, duration, and frequency of lake level necessary to maintain the existing Conesus Lake ecosystem; and the second was to evaluate baseline information concerning the Conesus Lake Outlet, Conesus Creek.

Cultural Resource Predictive Model, Literature and Records Search for Conesus Lake, by P/RA Research Inc., February 1979 for the U.S. Army Engineer District, Buffalo. This study is a report on the literature and records search and the development of a model which predicts the location of pre-historic sites in the Conesus Lake area.

THE REPORT

The results of the studies are presented in three parts: The Main Report, the Environmental Impact Statement (EIS), and six appendices. The main report is a nontechnical presentation which gives the results of the studies and a broad view of the overall study. It also contains the recommendations.

The EIS (colored pages) contains the results of the environmental studies and the effect the proposed plan will have on the human and natural environment.

The Appendices A through E contain the technical information which is summarized in the main report. These are the key documents for the technical

reviewer. Each appendix deals with a specific technical area: A - Hydraulics and Hydrology, B - Economics, C - Geotechnical, D - Design, E - 404 Evaluation. Appendix F contains pertinent correspondence in connection with the study. Appendix G contains letters received, during public coordination of the draft DPR and DEIS, with a Corps of Engineers response.

RESOURCES AND ECONOMY OF THE STUDY AREA

Conesus Lake is located in the Genesee Valley (Figure 1) in the Finger Lakes Region of New York State. It is the most westerly of the 11 Finger Lakes and is the largest of the five "little Finger Lakes." Conesus Lake is easily accessible from several urbanized areas of New York State, as it is located about 25 miles from Rochester, 65 miles from Buffalo, and 100 miles from Syracuse. The lake is situated in Livingston County within the towns of Geneseo, Livonia, Conesus, and Groveland.

ENVIRONMENTAL SETTING AND NATURAL RESOURCES

The Conesus Lake basin consists of an area of 69 square miles, including the lake surface, which drains through Conesus Creek to the Genesee River. The basin is a north-south valley, roughly rectangular in shape, having an average width of about 6 miles and a length of about 17 miles.

Conesus Lake itself may also be classified as roughly rectangular in shape even though the lake narrows from an average width of 0.6-mile to 0.25-mile for about 1,000 feet, midway along its 7.8 mile length. The surface area of the lake is about 5.0 square miles at normal water level. The southern half of Conesus Lake has an average depth of about 50 feet, while the average depth in the northern half is about 38 feet. A shallow area having a maximum depth of about 10 feet extends about 2,500 feet from the northern shore. Immediately to the south of the lake is a wooded marshy area consisting of about 1,000 acres which floods during periods of high runoff and provides natural storage capacity for retarding peak runoff during the late winter and early spring.

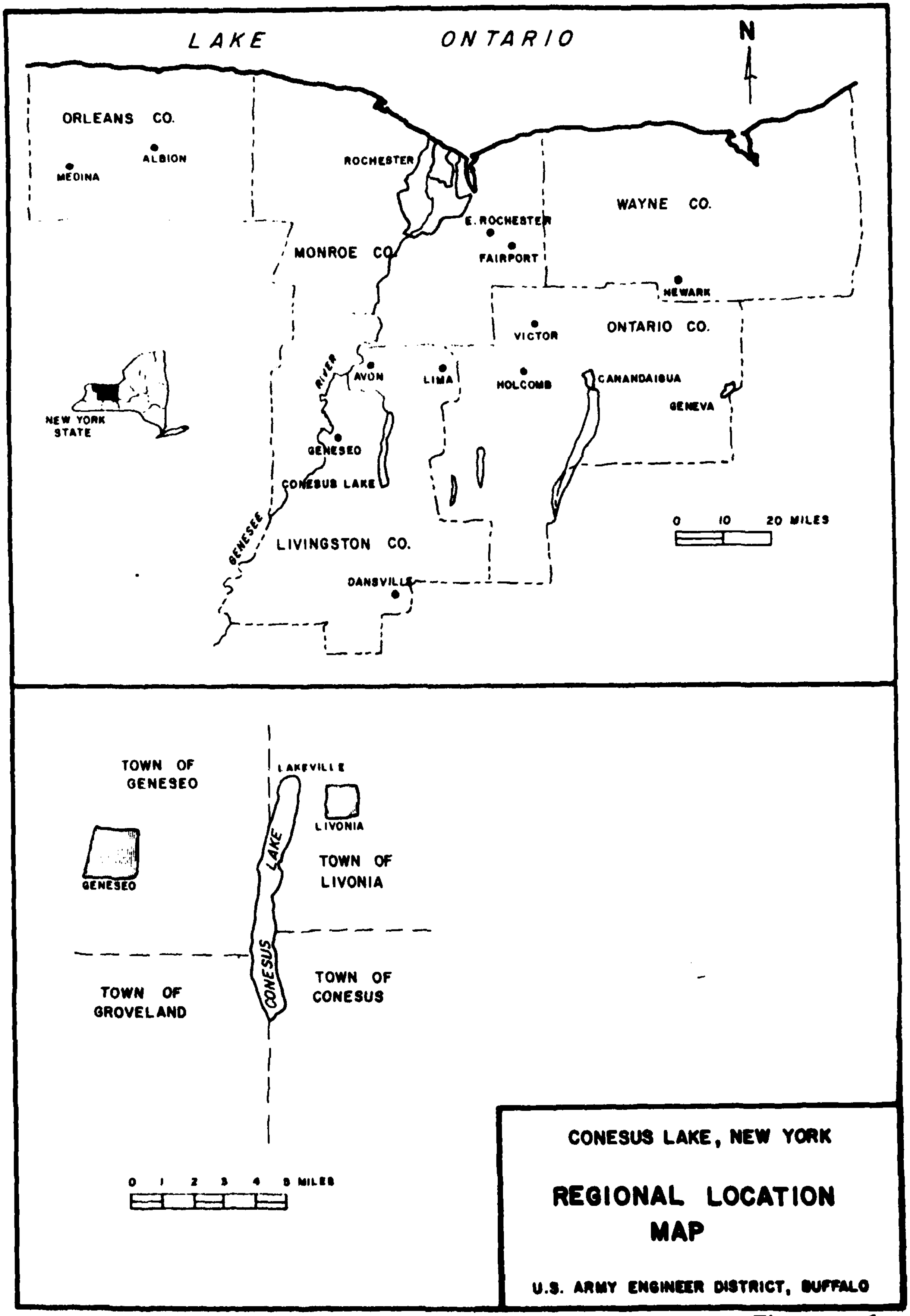
The runoff from the watershed is passed directly to the lake by overland flow from the steep valley slopes and by numerous small tributaries of relatively short length. Conesus Inlet, the longest stream entering the lake at the southern end, has a total length of about 6.5 miles. The runoff from the watershed is quite flashy due to the limited upland storage capacity and due to the relatively high surface gradient. This runoff is normally of short duration but peak discharges may often be substantial.

Conesus Creek, the Conesus Lake Outlet, (Figure 2) is a small stream that has restricted capacity. It meanders downstream past the sewage treatment plant to a marsh above the Route 256 bridge. It ultimately drains into the Genesee River.

The lake is best characterized by boating, fishing, and water-related recreation in the summer and ice fishing, snowmobiling, and cross country skiing in the winter. Its water quality is excellent, particularly since the construction of a sewage collection system around the perimeter of the lake. Figures 3 shows some of the area's resources.

CLIMATOLOGY

Livingston County has long, moderately severe winters and short, cool summers. The yearly average mean temperature is 48°F with July being the warmest month (71°F) and February the coldest month (24°F). Precipitation is


LAKE ONTARIO
N
ORLEANS CO.
ALBION
MEDINA
ROCHESTER
MONROE CO.
E. ROCHESTER
FAIRPORT
WAYNE CO.
NEWARK
ONTARIO CO.
VICTOR
AVON
LIMA
HOLCOMB
CANANDAIGUA
GENEVA
RIVER
GENESEE
NEW YORK STATE
GENESEO
CONESUS LAKE
LIVINGSTON CO.
DANSVILLE
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GENESEO
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TOWN OF LIVONIA
TOWN OF CONESUS
TOWN OF GROVELAND
0 1 2 3 4 5 MILES
CONESUS LAKE, NEW YORK
REGIONAL LOCATION MAP
U.S. ARMY ENGINEER DISTRICT, BUFFALO

Figure 1

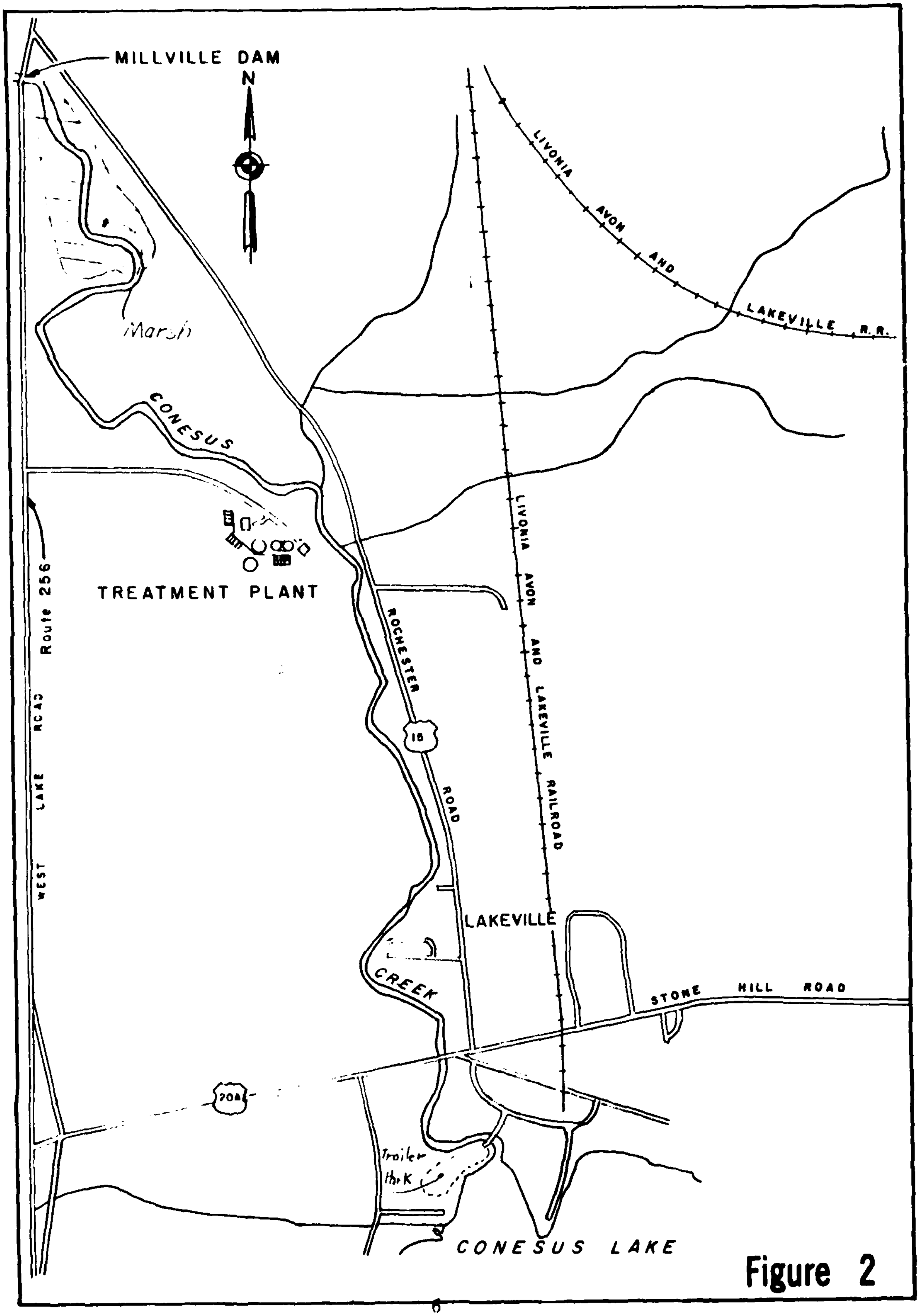

MILLVILLE DAM
N
Marsh
CONESUS
LIVONIA AVON AND LAKEVILLE R.R.
TREATMENT PLANT
Route 256
WEST LAKE ROAD
ROCHESTER ROAD
18
LIVONIA AVON AND LAKEVILLE RAILROAD
LAKEVILLE
CREEK
STONE HILL ROAD
20A
Trailer Park
CONESUS LAKE

Figure 2

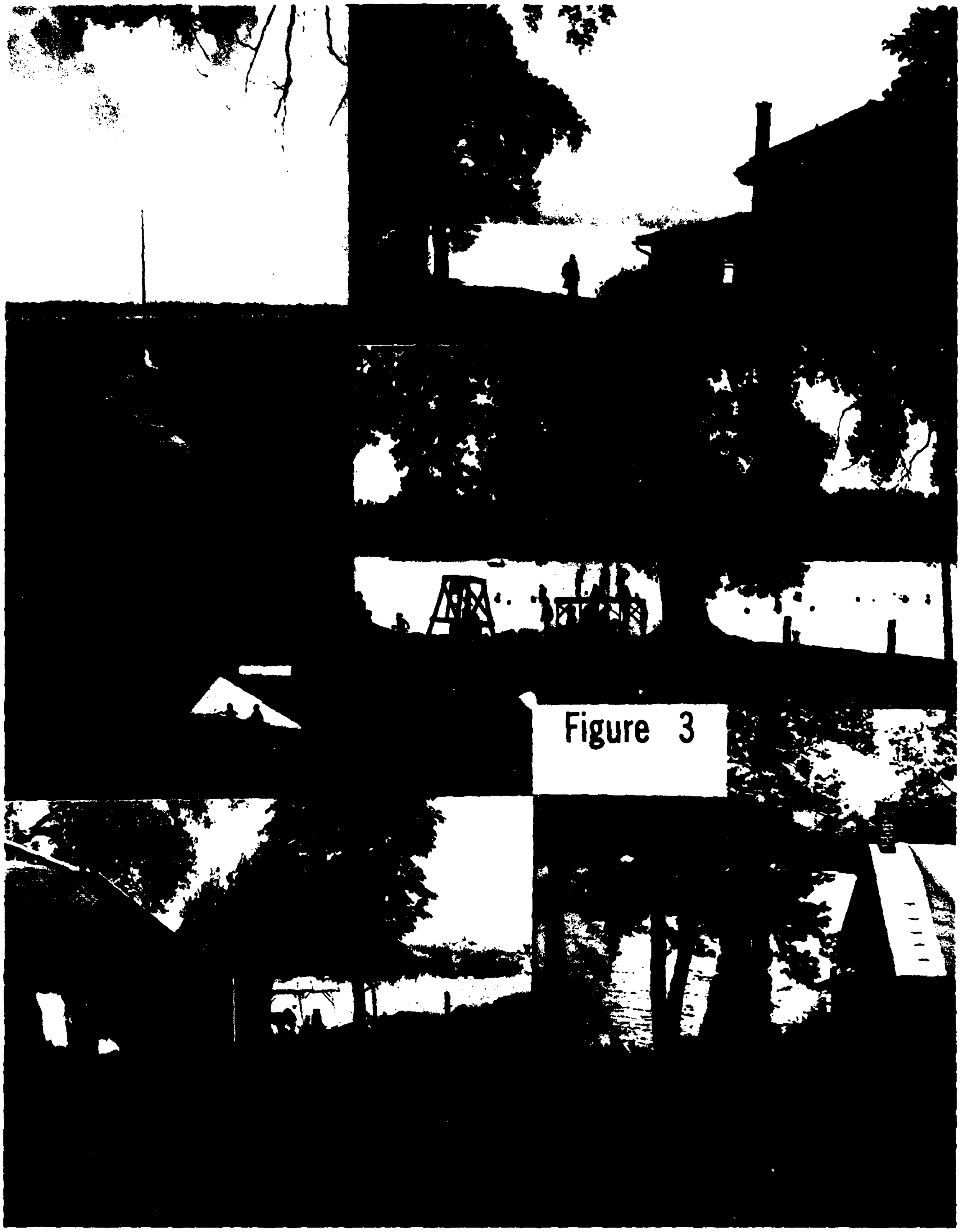


Figure 3

fairly evenly distributed throughout the year. The normal annual precipitation is 32.6 inches with a range from 3.1 inches in June to 2.4 inches in February.

HUMAN RESOURCES

Conesus Lake and the surrounding towns of Conesus, Livonia, and Geneseo showed a steady growth in population from 1950 to 1970, with only the town of Groveland showing a decline. Livingston County showed a 22.7 percent increase in population from 1960 to 1970 (Table 1). Per capita personal income increased by 94 percent in Livingston County. A comparison of the personal incomes for the United States, Rochester SMSA Counties, and Livingston County is shown in Table 2. The SMSA is a geographical area defined by the U.S. Department of Commerce and is used as a basis for presenting statistical information about an area.

Table 1 - Population

	Number of Persons		
	1950	1960	1970
Rochester SMSA	675,216	800,658	961,516
Livingston County	40,257	44,053	54,041
Conesus (T)	809	1,221	1,533
Geneseo (T)	3,782	4,337	7,278
Groveland (T)	3,381	3,373	3,004
Livonia (T)	2,896	3,526	5,304

Source: Rochester Area Business Fact Book, Part 2, 1974.

Table 2 - Per Capita Personal Income
New York State and Rochester SMSA Counties

Location	1969	1978	Percent Increase 1969-1978	Percent of U.S. Average 1969	Percent of U.S. Average 1978
	$	$	$	$	$
United States	3,667	7,840	114		
New York State	4,328	8,230	90	118	105
Livingston County	3,380	6,564	94	92	84
Monroe	4,533	8,891	96	131	112
Ontario	3,778	7,230	91	103	92
Orleans	3,600	6,902	92	98	88
Wayne	3,773	7,331	94	103	94

Source: U.S. Department of Commerce, Bureau of Economic Analysis Survey of Current Business, Vol. 60, No. 4, April 1970.

LAND USE

An existing generalized land use map for the Conesus Lake drainage basin is presented in Figure 4. This map is derived from the New York Land Use and Natural Resource (LUNR) mapping and portrays the generalized uses as observed in 1968. Much of the area is still agricultural. Some of the forested areas may be suitable for development; others, because of steep slopes (especially in Conesus), or county policy, might not be suitable for development.

There is an adopted county comprehensive land use plan (Plate B1 - Appendix B) which is intended to guide the growth and development in the county. Each town in the vicinity of Conesus Lake also has adopted zoning ordinances which limit the kind of development that can occur in a given area. The zoning in the vicinity of the lake generally permits one or two-family units on the lake shore and on the land side opposite the road (each town has different zoning classifications).

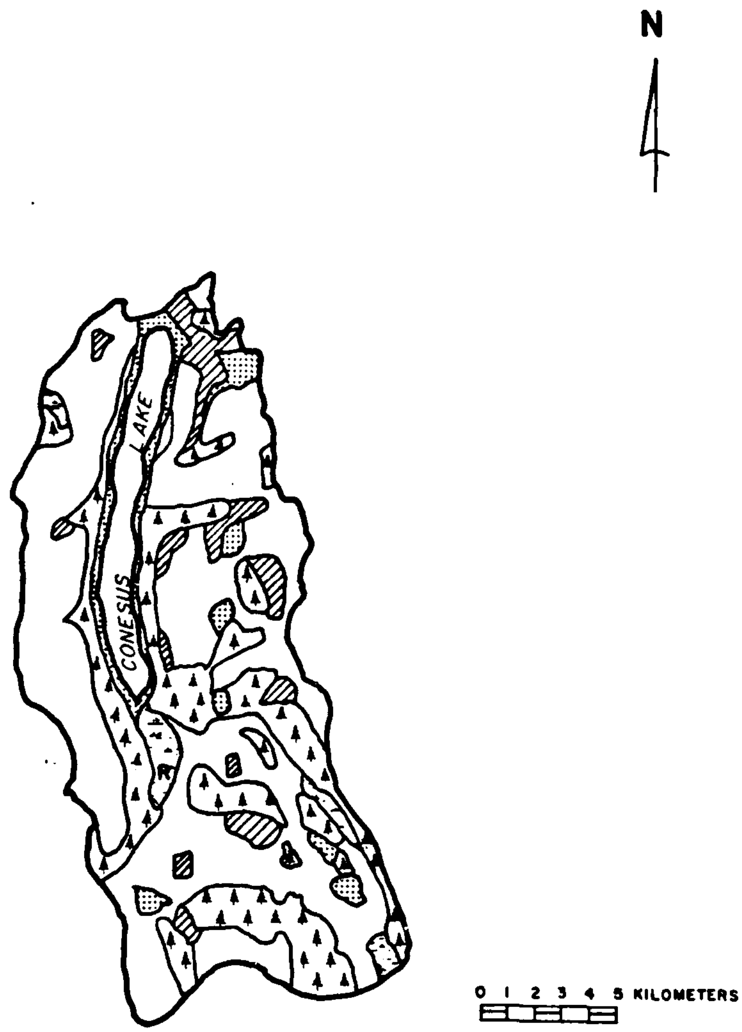
The future effects of growth due to the Genesee Expressway, as well as the flood management plan, are discussed in Appendix B.

RECREATION AND OPEN SPACE

Being a natural Finger Lake, Conesus Lake is itself a major recreational site. It was historically a place where people from Rochester and Buffalo could easily travel for a day's rail or boat outing. Cottages were also built and people could enjoy the lake during the summer, and eventually many winterized their homes so they could live there all year round. Because of the riparian laws of New York State, however, as homes were built around the periphery of the lake and the lodges and tent grounds were replaced by private homes, public access to the lake was limited. Today the public can utilize the State boat launching dock on the east side of the lake near Lakeville and can enjoy the public lake access at Long Point, where there are also amusement facilities and food concessionnaires in the summertime. In the winter, the public may use the lake for ice fishing, skating, and snowmobiling. A more detailed discussion of recreational facilities at Conesus Lake is presented in Appendix B.

ECONOMY

The projections of economic activity in the Conesus Lake area were developed jointly by the Department of Commerce's Bureau of Economic Analysis and the Department of Agriculture's Economic Research Service. The acronym "OBERS" has been applied to the projections by those agencies. The "OBERS" projections and other reliable sources indicate a steady population growth in the Conesus and Rochester areas for the next 50 years. The local economy is closely tied to that of Rochester. Along with the expected population increase, OBERS also shows continued increases in per capita income, value of farm products, manufacturing, and services. It is interesting to note that many of the local residents contacted during the study were employed in Rochester, NY, by two well-known Rochester-based firms, Kodak and Xerox.



EXPLANATION:

- ACTIVE FARMLAND
- INACTIVE FARMLAND
- RESIDENTIAL OR PUBLIC
- FOREST
- WETLAND
- R WILDLIFE REFUGE

REFERENCE: NEW YORK STATE LUNR MAP
PREPARED BY CORNELL UNIV.

CONESUS LAKE, NEW YORK

WATERSHED LAND USE MAP

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Figure 4

PROBLEMS AND NEEDS

The Conesus Lake area has water resource related problems and there is a need for water resource development. Flooding is a problem and some type of flood management is needed. Recreation is restricted late in the summer because of low lake levels. The difference between flooding and low lake levels is about 2 to 3 feet or less than 3 inches of runoff. Fish and Wildlife concerns are also related to lake levels and are addressed in the study. Water supply was addressed in the study but was dismissed as not being a problem.

FLOODS ON CONESUS LAKE

Flooding that affects cottages, homes, docks, and grounds around Conesus Lake and along its outlet has generally been reported in the spring. However, the worst storm of record was a result of Tropical Storm Agnes and occurred in June of 1972 (Figures 5-12). Flood damage begins on Conesus Lake at about an elevation of 819.5. The floods of 1972 and 1956 had peak elevations of 822.50 and 822.07. These floods affected about 1,300 cottages and homes around the lake.

The reach of the outlet channel, about 1.5 miles between the lake and State Route 256, is in extremely poor condition, being very curved and obstructed by trees, brush, and debris. An existing weir under the Millville bridge on Route 256 raises the water surface about 5 feet, resulting in a very flat hydraulic gradient for about 5,000 feet upstream of Route 256. This weir consists of three corrugated metal pipes cast in the concrete weir. The pipes have metal covers that are removed whenever large flows are expected. If these covers were not returned, the marsh would soon be drained. The existing control structure, which is located just upstream of the Route 20a bridge, is ineffective as a flood control structure because of the poor channel capacity between it and the lake. Its primary function is to maintain lake stage during the summer months; however, its effectiveness is marginal.

WATER SUPPLY

Conesus Lake serves as the source of water for several communities in Livingston County. The villages of Avon and Geneseo, the hamlets of Lakeville, East Avon, Retsoff, and York, and individual households surrounding Conesus Lake, all rely on the lake for water supply. Avon, Geneseo, and Lakeville maintain their own pumping facilities on the lake. Both Avon and Geneseo are authorized to withdraw a maximum of 3 mgd. East Avon and the York complex purchase their water from Avon and Geneseo, respectively.

WATER QUALITY

In 1976, the communities of Lakeville, Livonia, and the peripheral development ringing Conesus Lake began utilizing a sewage collection system. Previously, these residences were on septic systems. This perimeter collection system has changed the nutrient load to the lake and is expected to improve the basic ecosystem of the lake. The treatment plant discharges into the outlet and requires a minimum average discharge of 10 cubic feet per second.

Figure 5. June 1979; Conesus Lake flooding at 794 West Lake Road

Figure 6. June 1972; Conesus Lake flooding at 844 West Lake Road.

Figure 7. June 1972; Conesus Lake flooding at 786 West Lake Road

Figure 8. June 1972; Conesus Lake flooding at 788 West Lake Road

Figure 9. June 1972; Conesus Lake flooding inside 788 West Lake Rd.

Figure 10. June 1972; Conesus Lake flooding at 792 West Lake Road.

Figure 11. June 1972; Conesus Lake flooding at 792 West Lake Road.

Figure 12. June 1972; Conesus Lake flooding at 792 West Lake Road.

HYDROPOWER

Hydropower was not considered because the outlet's gradient is too flat to support water generation electricity.

WILDLIFE

A significant sport fishery exists on Conesus Lake. NYSDEC was particularly concerned that this resource be maintained. They were also concerned that any flood management implemented on Conesus Lake might impact on their marshes at the south end of the lake or the marsh just upstream of the Route 256 Bridge.

RECREATION

Conesus Lake is extensively and intensively utilized for water-oriented recreational activities. Two conditions affecting recreation, which were of concern to cottage owners on the lake are low water levels during summer months and an increasing growth of aquatic plants. The Conesus Lake Association has established an elevation of 819 as the optimum level for recreation with a level of 818 considered as satisfactory. The surface area of this lake at elevation 819.00 is about 3,800 acres.

The lakeshore is intensively developed with an average of about 75 cottages or houses per mile of shoreline resulting in little or no access to the public (Figure 13). The only public access, a State-maintained boat launching facility, is located on the east side of the lake.

Figure 13 - Shoreline development Conesus Lake, 1980.

PUBLIC CONCERNS

A brief list of public concerns related to the Conesus Lake Flood Management Study follows. The concerns were identified through previous reports, the study's public involvement program, correspondence, and personal communication (phone calls).

(1) Flood Related Problems - Damages, costs, and safety hazards caused by periodic flooding on the lake perimeter and at the outlet.

(2) Access to the Lake - Downstream interests are concerned about any Federal projects' impact on their ability to reach the lake by water.

(3) Dislocation of People - Lake outlet modification may require land currently occupied by house(s) or mobile homes.

(4) Target Lake Levels - Lake levels must be controlled to prevent flooding, achieve and maintain desired recreational levels, and ensure optimum water levels for wildlife habitat. The Millville (Route 256) and Lakeville (existing) control structures and McMillan Creek flows may affect lake levels.

(5) Cost Sharing - Land acquisition may be required for realignment of the outlet and for channelization of Conesus Creek to improve flow characteristics. Sewer lines may require relocation.

(6) Impact on Water Quality - Currently there is water stagnation at the north end of the lake.

(7) Amount of Time Required for the Study - Discussion of Conesus Lake flooding problems and the possibility of Federal aid have been going on since 1956.

NEEDS AND OBJECTIVES OF THE ACTION

The valley slopes surrounding Conesus Lake are steep and contain numerous small tributaries. Peak discharges from the watershed are substantial during late winter and early spring as well as during heavy rains. Low discharges are associated with periods of light runoff in the summer and early winter.

The lake outlet drains to the north through a wooded, marshy area. The outlet has received little maintenance and contains numerous natural and artificial constrictions. The limited capacity of the outlet during peak discharges results in high lake levels which flood property bordering the lake. Spring flooding is a frequent occurrence, causing damage to docks, retaining walls, grounds, cottages, and homes. The floods of greatest magnitude occurred in March 1936, May 1954, March 1956, April 1960, and June 1972.

A steel sheet pile overflow weir with movable stop logs was constructed about 1,000 feet from the lake mouth by local interests in 1964. The stop logs are inserted in the spring to restrict the discharge and maintain desirable summer recreation levels in the lake; however, the weir has had only

limited effect on high lake levels.

The following needs have been identified:

(1) Reduction in flooding of the lake residences;

(2) Sufficient lake levels for fish spawning;

(3) Sufficient lake levels for summer recreation;

(4) Sufficient discharge from the lake for waste assimilation; and

(5) Early construction of a project.

FORMULATING A PLAN

The studies to determine the best plan of improvement for Conesus Lake were done in accordance with the Principles and Standards for Planning Water and Related Land Resources as established by the Water Resources Council and the National Environmental Policy Act of 1969. Water resources planning under these guidelines is directed at improvement of the quality of life through contributions to the objectives of national economic development and environmental quality. The objective of this study, after considering the water resource problems and the need for water resource development in the Conesus Lake area, is to find an engineeringly and economically feasibile flood control plan for Conesus Lake which is both environmentally and socially acceptable.

PLANNING OBJECTIVES

Development of the various alternative flood management plans for Conesus Lake considered both the two national water resource planning objectives as defined by the U.S. Water Resources Council and a number of study area specific planning objectives developed in relationship to the public concerns identified for Conesus Lake.

a. National Objectives

(1) National Economic Development (NED) is enhanced by increasing the value of the nation's output of goods and services and improving national economic efficiency.

Enhancement of national economic development is achieved through optimum development of water and related land resources. The present and projected needs should be assessed in terms of the relationship to flood management and related water resource development. The annual costs of the measures for various purposes should be compared with the annual benefits in order to evaluate plans on the basis of economic efficiency.

(2) The quality of the environment (EQ) is enhanced by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural (archaeological and historical) resources and ecological systems. Historical, wildlife, and scenic values should also be evaluated as appropriate. The impact of improvement measures on wetlands, aquatic life, historic sites, and potential induced development should be a major consideration in selection of a viable alternative.

b. Planning Objectives

The planning objectives developed for Conesus Lake are to enhance the NED and EQ by the management of water and related land resource needs on a national, State, and local level.

The planning objectives addressed for a 1982 to 2032 period of analysis are as follows:

(1) To reduce future flood related losses to natural, cultural, social, and economic resources in the Conesus Lake Basin;

(2) To preserve cultural resources in the Conesus Lake Basin which would contribute toward protecting a part of the heritage of Livingston County, NY.;

(3) To preserve, protect or enhance the quality of fish and wildlife habitat where possible in the Conesus Lake Basin,

(4) To insure recreational opportunities for social enhancement when environmentally and economically feasible in the Conesus Lake Basin;

(5) To maintain water access to Conesus Lake for residents living along the outlet;

(6) To minimize disruption to the trailer park community located at the outlet of Conesus Lake;

(7) To maximize public acceptability to facilitate early construction; and

(8) To try and maintain the marsh upstream of the Route 256 bridge (Figure 14).

Figure 14 - View of marsh upstream of Route 256 Bridge.

FORMULATION AND EVALUATION CRITERIA

Formulation of a plan of flood management for Conesus Lake was accomplished within the context of the planning objectives by evaluating all reasonable flood management alternatives with attention to the environment and considering the desires of local interests expressed at public meetings, workshops, and correspondence.

TECHNICAL ASSUMPTIONS & PROCEDURES

The following technical criteria were adopted for developing a flood management plan:

a. Computer modeling of the water levels of Conesus Lake was done using the HEC-5 computer program (HEC-5 is a computer program developed by the Corps Hydrologic Engineering Center HEC).

b. Lake levels prior to the installation of the existing control structure were adjusted to be consistent with current lake levels.

c. Rating curves and water surface profiles in the outlet were developed using HEC-2 computer program.

d. Inflows-outflows of the lake were developed using a Buffalo District computer program.

e. Average annual damages were developed using a Buffalo District computer program.

f. Other technical details will comply with Corps engineering standards, regulations, and guidelines.

ECONOMIC, ENVIRONMENTAL, AND OTHER CRITERIA

The economic, environmental, and other criteria considered in formulating a plan are as follows:

a. A flood management plan must effectively contribute to the attainment of the national economic development and environmental quality objectives.

b. A flood management plan must have net national economic development benefits unless the deficiency in net benefits is the result of benefits foregone or additional costs incurred to serve the environmental quality objectives.

c. A flood management plan selection must consider other criteria which includes acceptability, certainty, completeness, effectiveness, efficiency, equity, planning space, reversibility, and stability.

d. A flood management plan selection must include a systematic, interdisciplinary approach which insures the integrated use of the natural and social sciences and the environmental design arts.

e. A flood management plan should generally reflect a consensus of opinion of the affected public.

f. A flood management plan must be evaluated in accordance with the National Environmental Policy Act of 1969 and the NED Benefit Cost Analysis as presented in Corps engineering regulation numbered 1105-2-300.

g. A flood management plan should not increase damages downstram of the project area.

POSSIBLE SOLUTIONS

The planning process requires at least three iterations of four tasks which are: problem identification, formulation of alternatives, impact assessment, and evaluation. The first iteration is usually a reconnaissance to determine if there is a Federal interest. The second iteration identifies a broad range of potential courses of action; and the third iteration results in detailed plans which are capable of being implemented.

The major problem confronting the residents of Conesus Lake is periodic flooding from high lake stages. In addition, the need for adequate lake levels for recreation and fish spawning was identified as a problem. The second iteration of the planning process started in January 1979 and culminated with the presentation of four possible solutions at a public meeting in October 1979. Nine possible solutions were developed during Stage II and included two nonstructural (lake management and floodproofing, warning, etc.), six structural, and no action. A description of the solutions developed during Stage II follows. Figure 15 on the following page shows the general topography referred to in the plan description.

a. No Action

This alternative assumes no Federal action to solve the flood problems around Conesus Lake.

b. Nonstructural

Two nonstructural solutions were developed.

(1) This solution consisted of a combination floodproofing, evacuation, flood warning, flood insurance, flood plain management, and acquisition.

(2) This solution consisted of lake level regulation using the existing facilities to reduce flood damages while considering required lake levels for recreation, fish and wildlife, water supply, and downstream water demand.

c. Structural Solutions

All structural solutions involved construction of a control structure, a drop structure just downstream of the Route 20A bridge, channelization, and some lake level regulation to determine when the control structure should be

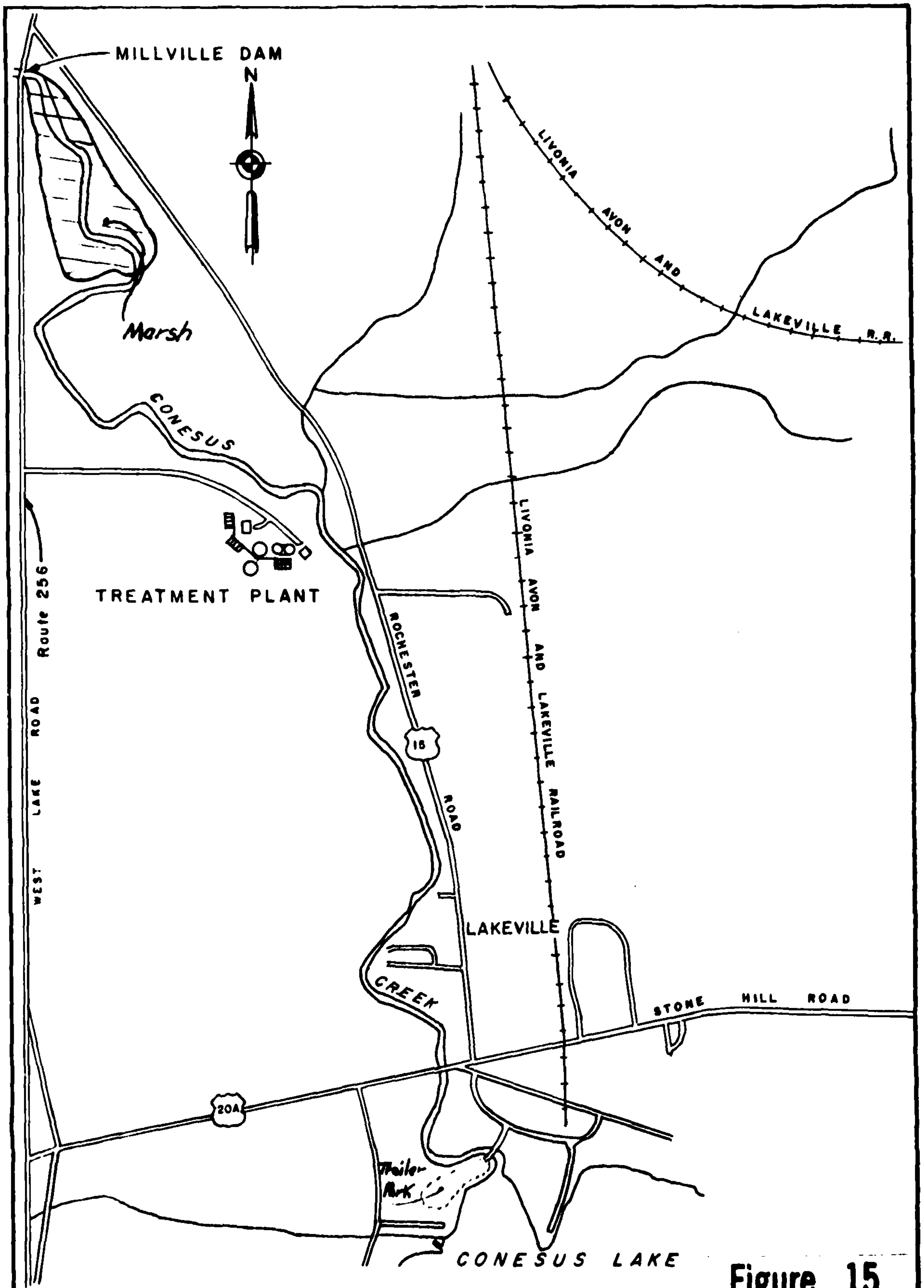

MILLVILLE DAM
N
Marsh
CONESUS
TREATMENT PLANT
Route 256
WEST LAKE ROAD
LIVONIA AVON AND LAKEVILLE R.R.
LIVONIA AVON AND LAKEVILLE RAILROAD
ROCHESTER ROAD
15
LAKEVILLE
CREEK
STONE HILL ROAD
20A
Trailer Park
CONESUS LAKE

Figure 15

opened. Some of the plans also required modifications to the Route 20A and Route 256 bridges. These plans are described below. The alternative plans are also identified by the size of their proposed channels. The larger channel alternatives were for greater flows. At this point in the study, lake level management had not been fully studied. Therefore, these alternatives were only screened based on their costs and impacts.

(1) (50/120 Plan) - This solution involves the removal of the weir under the Route 256 bridge. A new 50-foot wide trapezoidal earth channel with 1V on 3H (1 foot vertical for every 3 feet horizontal) sideslopes would be constructed from a point about 4,000 feet upstream of the Route 256 bridge to a point 66 feet downstream of the Route 20A bridge. The 50-foot channel would have a length of 5,050 feet, and its alignment would be along the existing channel. A 4-foot high and 75-foot wide drop structure would be constructed 66 feet downstream of the Route 20A bridge. Riprap would be placed both upstream and downstream of the drop structure, the Route 256 bridge, and the Route 20A bridge. A new 120-foot trapezoidal earth channel with 1V on 3H sideslopes would be constructed from the Route 20A bridge directly to Conesus Lake. Its length would be about 1,070 feet. At the outlet of Conesus Lake, a control structure with 8-15 foot wide sluice gates, or a combination of gates that would provide a net width of 120 feet, are required.

(2) (60 Plan) - This plan involves removal of the weir under the Route 256 bridge, and the construction of a new channel with a 60-foot bottom width with 1H on 3V sideslopes. The new channel would follow the present alignment from a point 200 feet downstream of the Route 256 Road bridge. From a point 50 feet upstream of the Route 20A bridge the new channel would run directly to Conesus Lake. Five 12-foot sluice gates (or their equivalent) would be built on the outlet at the north end of Conesus Lake. Some modification would be required for the Route 256 bridge and a new 65-foot wide bridge would be required at Route 20A along with a drop structure downstream of the bridge.

(3) (90 Plan) - This plan is identical to 60 Plan except that the new channel bottom would be 90 feet wide instead of 60 feet wide and there would be six 15-foot sluice gates (or their equivalent) at the north end of the lake instead of five 12-foot sluice gates. A new 65-foot wide bridge would be required at Route 20A along with modification to the Route 256 bridge.

(4) (110 Plan) - This plan would be the same as the 90 Plan except the new channel bottom width would be 110 feet instead of 90 feet, and eight 14-foot sluice gates instead of six 15-foot sluice gates (or their equivalent) would be required north of Conesus Lake. A new 65-foot wide bridge would be required at Route 20A along with modification to the Route 256 bridge.

(5) (30-60A Plan) - This plan follows the existing channel downstream from a control structure which would be located near the private road bridge at the mouth of the outlet. The control structure would most likely consist of steel sheet-piling with eight control gates. A 60-foot wide trapezoidal channel would be excavated beginning downstream of the control structure and ending just upstream of the Route 20A bridge. A 2.5-foot high, 60-foot wide drop structure would be constructed about 25 feet downstream of the Route 20A bridge. Riprap would be placed on the channel slopes for about 50 feet

upstream of the Route 20A bridge to 50 feet below the drop structure along with about 400 feet of slope protection along the left bank of the 60-foot channel. A 30-foot wide trapezoidal channel would be constructed from the drop structure to a point about 4,000 feet upstream of the Route 256 bridge (just below the sewage treatment plant). Both the 30 and 60-foot wide channels would follow the existing channel alignment. Modifications to the Route 256 bridge and the three pipes through the bridge would not be required.

(6) (30-60 Plan) - This plan is identical with the (30-60)A Plan except it would require the construction of a new channel to the lake which would start about 400 feet downstream of the private road bridge and run through the trailer park on the lake. This new channel would be a 260 foot long trapezoidal channel with a 60-foot bottom width and 1V on 3H side slope. The new channel would join the existing channel and proceed downstream as described in the 30-60A Plan. The control structure would be located in the channel and the existing channel would be plugged. A low-flow pipe would be installed to allow some flow to continue in the old channel. Please note that this plan was modified during Stage III planning by moving the control structure downstream and will be described again in that section of the report.

ALTERNATIVES ELIMINATED DURING STAGE II

Plans numbered 2, 3, and 4 above were eliminated from further consideration principally because of the cost of widening the Route 20A bridge and modifying the Route 256 bridge. In addition, they did not satisfy planning objective eight (maintain marsh upstream of the Route 256 bridge). The channel improvements would also have required relocating a significant portion of the sanitary sewer which follows the outlet. The costs associated with this relocation were estimated and deemed to be unresponsive to planning objective seven (maximize public acceptability for early construction).

The first plan (50/120) would have required relocating at least 500 feet of a gravity sanitary sewer transmission main which follows the outlet. This would have also disrupted the trailer park, along with requiring the purchase of at least three homes and one business. This plan was deemed unacceptable because it was unresponsive to planning objectives six, seven, and eight.

One of the nonstructural plans considered was a combination of: Floodproofing, evacuation, flood warning, flood insurance, flood plain management, and acquisition. Floodproofing, evacuation, flood warning were eliminated from further consideration because the flood plain consisted of cottages and homes which were frequently rented or could be unoccupied in the early spring when the most frequent flooding occurred. Flood plain management and acquisition were not carried forward because they did not meet the planning objectives, particularly when the flood plain is as completely developed as Conesus Lake. Flood insurance is in force on Conesus Lake, but does not provide a solution to flood damages which are expected to increase in the future.

The structural plans that were eliminated either had Benefit/Cost (B/C) ratios of less than one or were unresponsive to the planning objectives. In

addition, the decision to consider a combination of a structural solution and full lake level regulation (utilize natural storage capacity of the lake) allowed us to provide a high level of protection with the smaller structural solutions.

ALTERNATIVES CONSIDERED FURTHER

The third iteration of the planning process began after the four remaining plans were presented and accepted at a public meeting in October 1979. The problems and needs were again considered. The problems were reaffirmed to be: Flooding on Conesus Lake and a need for sufficient lake levels for fish spawning and recreation. In addition, planning objectives six (minimize disruption to trailer park) and seven (maximize public acceptability for early construction) were identified as being sensitive issues.

Also, at this time, the local cooperator (NYSDEC) expressed concern over the impact lake level regulation would have on their marshes south of the lake. They were particularly concerned regarding potential impacts on fish spawning. This is discussed in detail in the Environmental Impact Statement and Appendix E, 404 Evaluation , and mitigation summary.

EVALUATION OF ALTERNATIVES

The following nonstructural and structural alternatives were considered during this third and final iteration of the planning process. Costs and benefits were not a critical factor in the determination of the selected plan as they were similar for the two remaining structural plans. After the public meeting, an in-house interdisciplinary team determined the EQ and NED plans. The structural Plan 6 (30-60), with lake regulation was selected as the NED and EQ plan.

During Stage III, it became apparent that the control structure planned to be built near the lake could be located anywhere between the lake and the drop structure below the Route 20A bridge. Because of the advantages associated with this, the control structure was moved down to the drop structure in both structural plans (5 and 6).

No Action

This alternative provides a plan of no action. This is not a viable solution for Conesus Lake flood problems, since flood damages would still occur.

Nonstructural

This alternative provided for management of the lake with the existing control structure. Analysis during this stage found that the lake could not be adequately managed with the current control structure. The principal problem with the control structure is that it is too small and the channel capacity between the lake and the control structure was inadequate. Therefore, this was not a viable solution as flood damages would continue to occur.

Structural Plan 5 (30-60A)

This alternative provides for an improved channel which would follow the existing channel, a control structure, and a drop structure. With the use of the lake level model (HEC-5), it was possible to nearly eliminate all damages from the June 1972 (Tropical Storm Agnes) storm which was the target that appeared desirable for flood control. This plan, however, did not satisfy several of the planning objectives. Of particular concern was that this plan would disrupt the trailer park, would require taking two cottages would require removal of the private road bridge, and would require construction of an access road and pedestrian bridge across the 60-foot channel.

Structural Plan 6 (30-60) (NED & EQ)

This alternative (Plate 2) provides for an improved channel similar to Plan 5 above except it would require a diversion to be constructed through the trailer park leaving the existing channel above this point untouched and an access road to be constructed into the trailer park from the west. By moving the control structure downstream, the size of the diversion channel was reduced from 60 to 25-foot bottom width. The 260-foot long diversion channel would be completely trapezoidal with 1V on 3H side slopes. Furthermore, during the design of this plan, it was determined that by widening the 30-foot channel to 35 feet, its channel bottom could be raised about 2 feet. This was considered desirable as it allowed elimination of the drop structure and permitted the channel to clear a sanitary sewer crossing near the treatment plant. For the remainder of the report, any reference to Plan 6 (30-60). will assume a 35-foot channel not 30 feet. With the use of the HEC-5 computer model it was determined, as in Plan 5, that nearly all damages from the June 1972 (Tropical Storm Agnes) storm could be eliminated. As in Plan 5 (30-60A), this plan would be disruptive to the trailer park; however, it was judged to be far less disruptive than Plan 5 along with avoiding the two homes near the lake.

System of Accounts

The system of accounts that follows Table 3 was structured to illustrate the criteria used to select a plan. Each account is rated either (+) contributes to the account, (0) no appreciable change to the account, or (-) subtracts from the account. A zero is also given to those accounts that will only experience a temporary impact either + or -. In some instances, a double + or - 's given to illustrate a difference between two plans with similar but significantly different impacts. The pluses were totaled against the minuses with the result shown at the bottom. The impacts on the rest of the nation were not quantified as they were judged to be insignificant on the decision. The Environmental Impact Statement (colored pages) provides a detailed discussion of the various impacts of the different actions.

SELECTING A PLAN

The evaluation of alternatives in the system of accounts shows that the NED and EQ Plan, Plan 6 (30-60) with lake level regulation, is the most

desirable plan of improvement. The design and cost estimate of this plan were refined and are presented in Appendix D.

It is important to note that both Plans 5 and 6 would provide the same level of protection. Also because the preliminary cost of these plans was so similar, the use of cost as a selection criteria was eliminated from the system of accounts, Table 3. Plan 6 was designated the NED Plan based on the District's judgement that the contingencies associated with the plan were less significant than Plan 5.

Detailed rationale for selection of the degree of protection is included in Appendix A (Paragraph A1.12).

Table 3 - System of Accounts

Account	No Action	Non-Structural	Structural 5 (30-60a)	Structural 6 (30-60)
National Economic Benefits				
Inundation Reduction	0	0	+	+
Affluence	0	0	+	+
Intensification	0	0	+	+
Environmental Quality				
Air Quality	0	0	0	0
Archaeological and Historical	0	0	0	0
Water Quality	0	0	+	+
Wetlands	0	+	+	+
Fishery	0	+	+	+
Vegetation	0	0	0	0
Wildlife	0	0	0	0
Groundwater Table	0	0	0	0
Social Well-Being				
Scenery	0	0	+	+
Summer Recreation	0	0	+	+
Community Growth	0	0	+	+
Displacement of People	0	0	-	0
Lake Access	0	0	+	+
Land Acquisition	0	0	--	-
Utilities	0	0	-	-
Housing	0	0	+	++
Aesthetics	0	0	--	-
Trailer Park Impact	0	0	--	-
Regional Development	0	0	++	++
Property Value	0	0	++	++
Housing	0	0	+	+
Recreational Facilities	0	0	+	+
Property Tax	0	0	+	+
Preference				+
Local Cooperator (NYSDEC)				
Local Residents				+
Total	0	+2	+10	+18

THE SELECTED PLAN

PLAN DESCRIPTION

The selected plan (Plan 6, 30-60), Plate 2, includes improvements to the outlet, construction of a new control structure above the Route 20A bridge, and utilization of a lake level regulation procedure developed specifically for this plan. The outlet channel will be 60 feet wide upstream of the Route 20A bridge to the trailer park. The flow will then be divided between the existing channel and a new 25-foot bottom width, 1 on 3 side slope, diversion channel through the trailer park. In addition to constructing an access road into the trailer park from the west, the plan will also include construction of a pedestrian bridge across the diversion channel. The channel below the 20A bridge will have a 35-foot bottom width, with 1 on 3 side slopes. This channel will continue downstream for about 1 mile to just below the sewage treatment plant.

PLAN ACCOMPLISHMENTS

The selected plan will control the 25-year flood generated in the Conesus Lake Basin. This flood would be similar to the flooding experienced during Tropical Storm Agnes. The plan will provide for a more stable lake elevation for summer recreation along with providing planned raising of lake levels in the spring to satisfy fish and wildlife concerns. The plan will also maintain lake access for individuals living along the outlet, and preserve most all the trees and vegetation on the right (east) bank of the 35-foot channel (channel below Route 20A). The selected plan includes a lake level regulation plan with the following target elevations: from November through January, maintain a water level of 816.5 to provide for flood storage; during February, March, April, and May allow the lake to rise due to spring runoff to a maximum level of 819.0 for fish spawning; maintain 819.0 from May through June; after 1 July, draw the level down to 818.5 for recreation and hold through October; after October the lake is drawn down to 816.5.

ENVIRONMENTAL IMPACTS OF THE PLAN

This section summarizes the major environmental concerns encountered during the study. For a more detailed discussion of the impacts, refer to the Environmental Impact Statement (EIS) (colored pages in this report).

a. Construction - While construction is usually viewed as a major concern, because the project consists of excavating only about 70,000 cubic yards and installing only one small structure, it was not an important issue during the study. It is recognized that it will impact adversely on the outlet; however, since the project will be completed in less than 1 year, and the stream was determined not to be a valuable fish resource, this was not an issue.

b. Fish and Wildlife - Although Conesus Creek does not have an important fishery, Conesus Lake does and NYSDEC was concerned about the impacts the lake

level management would have on the fish population. Based on Corps studies, it was concluded that there may be some impact and that the plan may lead to improved conditions for the fishery with the mitigation plan. The mitigation of the wetland at the south end of Conesus Lake is described in the EIS and Appendix E.

c. Wetlands - There are three wetlands that could be affected by the plan. On Conesus Creek just upstream of the Route 256 bridge, there is a marsh. This marsh is created by a weir under the Route 256 bridge. The plan does not affect this marsh. There are two marshes adjacent to the south end of the lake. Both these marshes are owned by NYSDEC and there was concern that lowering the lake level in the winter and controlling the spring flooding might have an adverse impact on the marshes. The Corps studies indicated that the effect would have some impact on the wetland adjacent to the south end of the lake. A mitigation action is described in the EIS and in Appendix E.

d. Recreation - The principal recreational activities are centered around the lake. The plan provides for a recreational pool which meets or exceeds the traditional pool the lake has provided. Traditionally, the lake levels have declined in late July and August. These low levels severely restrict boating, Figure 16, at the north end of the lake because the water becomes too shallow. The plan will reduce this occurrence by maintaining adequate lake levels for a greater amount of time. The plan also maintains lake access to residents along the outlet who have had this access in the past.

Figure 16 - Photo of low lake levels at north end of the lake.

e. Cultural Resources - A cultural resources reconnaissance level survey was conducted in June 1981. The resulting report concludes that "none of the sites (identified in the survey) appear to qualify in and of themselves, but the sites on the east side of the lake might qualify for inclusion in some sort of archaeological district." None of the sites identified will be impacted by the proposed project.

f. Displacement or Acquisition - The State will be required to acquire lands, easements, and rights-of-way for construction and subsequent maintenance and operation of the project. The acquisition of lands for temporary and permanent easements would not displace any businesses or permanent residences in the project area. It will disrupt the trailer park and require about six trailers to be relocated within the park. There appears to be sufficient space in the park to handle these relocations. The park is owned by one individual who rents space to the owners of the trailers for 10 months of the year. Since the project will cut the trailer park in half, the plan includes construction of an access road from the west and a pedestrian bridge over the diversion channel. It is anticipated that the trailer park will still continue to operate, especially considering that the plan provides lake stage on the outlet around the trailer park along with unobstructed access to the lake. Since the pedestrian bridge and access road will be a permanent part of the project, their maintenance will be the responsibility of the local cooperator.

The channelization downstream of the 20A bridge will be accomplished by restricting excavation to the left (west) bank. This will leave the east bank for the most part untouched. This will minimize disruption to the residences on the east side of this channel, along with preserving most of the trees and vegetation.

DESIGN CONSIDERATIONS OF THE PLAN

The selected plan includes construction of a control structure upstream of the 20A bridge. The operating plan has a target lake elevation of 819 in the spring and tries to maintain at least 818.5 through the summer months. While there will be years when the plan is unable to sustain this range, it will sustain it more often than under existing conditions. A complete discussion of the hydrology of the plan can be found in Appendix A. Based on the core holes available, the soil is adequate to maintain the side slopes. Because the water velocities are low (4 feet per second and less), riprap will only be required in the vicinity of the control structure and along 400 feet of the left bank of the 50-foot channel. The remainder of the channel will be seeded as the design velocities are less than natural conditions and erosion is not currently a problem. During construction, protective measures cited in the environmental guidelines for the Civil Works program of the Corps of Engineers would be enforced to insure that such things as erosion, dust control, and proper debris disposal methods would be used. The diversion channel through the trailer park will disrupt the parks buried utilities. The electrical utility in the park will be easily relocated. The sewers will be cut and run down both sides of the diversion channel to the sewer collector that crosses this channel at the edge of the trailer park. Reduced Plates of 1" = 50' scale drawings are included in the design Appendix D as Plates D1 through D5.

The material excavated from the creek channel, in the reach between the Route 20A Bridge and the Route 256 Bridge (Millville Dam), would be distributed and graded in low areas along the west bank of the creek. This material has been tested in 1981 and determined to be nonpolluted when compared to the "National Primary Drinking Water Standards." The environmental impacts are evaluated in the EIS (EIS-48) and the Section 404 Evaluation is in Appendix E.

The material excavated from the new channel at the Conesus Lake outlet would be placed in a NYSDEC approved disposal site. A disposal site will be designated during the development of plans and specifications.

ECONOMICS OF THE SELECTED PLAN

METHODOLOGY

Economic justification is based on the degree of feasibility the plan indicates when costs and benefits are compared. *In this determination annual* costs, which include interest, amortization, and operation and maintenance are compared with the annual benefit that would be realized by implementing the plan. The annual costs and benefits were evaluated for a 50-year period, which is considered reasonable for a small project of this size. An interest rate of 7-3/8 percent was used in computing the annual costs and benefits.

COSTS

A first cost of $815,000 is estimated for Conesus Lake, Conesus Creek project. A summary of first costs is tabulated below.

SUMMARY OF FIRST COST
(March 1981 Price Levels)

Item	Total Cost
Lands	80,000
Relocations	30,000
Channels	281,000
Structures	131,000
Mitigation	64,000
Contingency @ 20 percent	99,000
Engineering & Design	62,000
Supervision and Administration	68,000
Total (First Cost)	815,000

SUMMARY OF ANNUAL COSTS

Item	Total Cost
Interest and Amortization	61,900
Operation and Maintenance	12,000
Total (Annual Costs)	73,900

BENEFITS

The quantitative benefits which accrue to the project are flood reduction benefits. These benefits include affluence which refers to the gradual increase in the value of household furnishings. Annual benefits based on March 1981 price levels are: $118,400 for Flood Inundation Reduction.

JUSTIFICATION

The estimated annual cost of the proposed plan is $73,900. The annual benefit is $118,400. The proposed plan is economically justified with benefit-to-cost ratio of 1.60.

Although the project is sized for a 25-year level of protection, it eliminates 96 percent of the average annual flood damages. Thi is discussed in more detail in Appendices A and B.

Legislative and administrative policies have established the basis for Federal and non-Federal responsibilities in the construction and in the operation and maintenance of Federal water projects. The major non-Federal responsibilities required in the Conesus Lake project as set forth in the Flood Control Act of 1948 and in accordance with Section 221 of the Flood Control Act of 1970 and Section 40 of the Water Resources Development Act of 1974 are: Provide all lands and easements, perform all relocations, and operate and maintain the project.

COST APPORTIONMENT

Apportionment of the first costs and annual operation and maintenance costs are:

COST APPORTIONMENT (1)

Item	Federal	Non-Federal	Total
	$	$	$
First Cost			
Lands		80,000	80,000
Relocations		30,000	30,000
Channels	281,000		281,000
Structures	110,000	21,000	131,000
Mitigation	64,000		64,000
Contingency @ 20 percent	91,000	10,000	101,000
Engineering and Design (2)	55,000	8,000	63,000
Supervision and Administration	60,000	5,000	65,000
Total	661,000	154,000	815,000
Annual Operation and Maintenance		12,000	

(1) Current detailed cost apportionment between State and Federal Government does not apply to small projects program.
(2) Includes $5,000 for preparation of an operation and maintenance manual.

FEDERAL RESPONSIBILITY

The Federal Government will design and prepare detailed plans after the project is approved and funded. The Federal Government will construct the control structure and the channels after the non-Federal sponsor has purchased all the lands and easements and completed all of the necessary relocations.

NON-FEDERAL RESPONSIBILITIES

In New York State, the NYSDEC is by law the non-Federal sponsor on all Federal flood control projects. They will enter into a contract with the Federal Government to provide all the required non-Federal assurances. By law, they will provide all lands, easements, and necessary relocations but they traditionally require the protected communities to provide the necessary maintenance and to relocate any utilities that belong to the local community.

The non-Federal sponsor will be responsible for operating the lake in accordance with the Lake Regulation Plan. This will be fully described in the Operation and Maintenance (O&M) Manual which will be provided when the plan has been constructed. Although the details of the lake level regulation plan are described in Appendix A, this is not intended to be an O&M Manual.

The non-Federal sponsor will also be responsible for maintaining the lake level gage currently installed on the lake.

A pedestrian bridge would be constructed across the new channel to connect the severed trailer park area for maintenance and pedestrian access. The design, construction, and maintenance would be a non-Federal responsibility.

The non-Federal sponsor will enforce flood plain regulations downstream from the control structure along Conesus Outlet Channel to the Genesee River. The area along the outlet is presently undeveloped. This area has a future potential for development that could jeopardize the effectiveness of the project if a large flood should occur. Significant event floods would require that large flows be released at the control structure. During the release, a channel free from encroachment from developments would assure limited damage in the downstream reaches.

VIEWS OF NON-FEDERAL INTEREST

The views of non-Federal interests were obtained at a public meeting held in October 1979, through interviews with local officials and residents, a newsletter, extensive coordination with the Conesus Lake Homeowners Association which represent the majority of the homeowners on Conesus Lake, and NYSDEC. Nearly all the participants favor the selected plan. The only opposition expressed was from the owner and selected members of the trailer park. These members were principally concerned that they might lose their spaces or be moved out of the trailer park. It is important to note that not all the members of the trailer park who expressed their concerns were opposed to the plan, several were in favor of it. The owner of the trailer park was interviewed and was concerned that the diversion plan would divide the trailer park and disrupt the utilities (sewer and electric) which are buried in the park. For a more complete discussion of the coordination and views of non-Federal concerns, refer to the public involvement portion of the EIS.

VIEWS OF FEDERAL INTEREST

The U.S. Fish and Wildlife Service in their Coordination Act Report made recommendations and suggestions for consideration in the final design of the project. The following is a list of the recommendations and the corresponding District response:

1. Prior to project construction, a plan be developed by the Corps of Engineers in cooperation with and approved by the New York State Department of Environmental Conservation, the U.S. Fish and Wildlife Service, the U.S. Soil Conservation Service, and the U.S. Environmental Protection Agency, to minimize the amount of project-caused erosion, siltation, and water pollution in the outlet creek during and immediately after construction.

Response - During construction, the Contractor will be required to follow guidelines on environmental protection outlined in Corps of Engineers Civil Work Construction Guide Specifications relative to Protection of Environmental Resources (para. 7.1 thru 10 of CW-01430, dated July 1978). A plan for the minimization of project-caused erosion, siltation, and water pollution in Conesus Creek will be coordinated with New York State Department of Environmental Conservation, U.S. Fish and Wildlife Service, and the Soil Conservation Service. The aforementioned agencies will be asked to review and comment on the above mentioned plan. Their views will be considered before the Corps finalizes and implements the protection plan. Disturbed banks will be seeded and mulched with grasses and legumes adaptable to growing conditions in the area soon after construction is completed, to help reduce erosion. Trees and shrub plantings will be incorporated into the final design to ensure continuance of riparian vegetation.

2. To minimize adverse impacts on fish and wildlife resources, all construction activities associated with instream or streambank areas, including the construction of a water control structure, be restricted to the period from July 1 to March 30.

Response - The construction of this project will be scheduled for late summer and/or fall to minimize impacts to fish and wildlife resources.

3. To mitigate project-caused losses of wildlife habitat, the banks of the rechannelized outlet creek and the banks of the new outlet channel, as well as any upland areas disturbed during channel work and other construction activities, be revegetated as soon as possible after project construction. We further recommend that (a) prior to project construction, a revegetation plan be developed for the project in cooperation with and approved by the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service, (b) the plan include provisions for the monitoring of growth conditions to ensure that revegetation is successful and the replacement of dead or dying plant species, and (c) all replanting, maintenance, and monitoring activities be funded as project costs.

Response - A planting scheme will be established through coordination with NYSDEC and USFWS. The disturbed area will be revegetated as soon as

possible after construction is complete. The Corps will monitor the planting for one growing season and replace any dead or dying species. At this time, further vegetation planting would become the responsibility of the local sponsor, in this case NYSDEC, as part of the local cooperation agreement.

4. To mitigate the potentially adverse effects of lake level management on fish and wildlife and their habitats, lake levels be held at or near the operational levels established in cooperation with and approved by the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service for the conservation and development of fish and wildlife resources, and that these criteria be adhered to by the Corps of Engineers as long as it exercises direct operational control of project features, and that any agreements entered into for the delegation or release of operational control to another agency include stipulations to prevent deviation from these criteria.

Response - The Corps of Engineers will prepare an Operation and Maintenance Manual for the regulation of Conesus Lake. This manual will be presented to the local cooperator, NYSDEC, upon completion of the project. The manual will instruct the operator in the procedures for the proper operation of the control structure according to the recommended target rule curves.

5. To compensate for project-caused losses of northern pike spawning habitat and productivity at Conesus Lake, approximately 10 acres of State-owned wetland at the lake be scalped and graded to provide the quantity and quality of spawning habitat needed to offset those losses. We further recommend that (a) all scalping and grading be done in accordance with the Fish and Wildlife Management Area habitat management plan (Fig. 4), (b) excess spoil from the scalping process be deposited and shaped to form a berm on the upland side of the scalped areas, (c) all stripped areas be seeded using rye grass, reed canary grass, or other suitable cover plants prescribed by the New York State Department of Environmental Conservation, and (d) the estimated $64,000 needed to provide the above habitat management features be funded as a project cost.

Response - A mitigation plan was coordinated among NYSDEC, USFWS, and the Corps of Engineers which recommends scalping, grading, and seeding of 10 acres in the Ames parcel wetland. This mitigative measure enhances the probability that this area will be covered with a sufficient depth of water during the spawning/nursery season, to increase availability to northern pike for spawning. Recommendations a, b, c, and d will be implemented.

6. To enhance public use of fish and wildlife resources, public access for ice fishing be provided at the north end of Conesus Lake where there are currently no public access sites. We further recommend that (a) one of the three alternative sites proposed by the Division of Fish and Wildlife of the New York State Department of Environmental Conservation (Fig. 5) be ultimately chosen as the selected site, (b) the New York State Department of Environmental Conservation's preferred site (Area B) be given first priority for consideration as the selected site; and (c) that all costs for land acquisition and construction for this recreation feature be cost-shared by the Federal Government and the State of New York in accordance with provisions of U.S. Public Law 89-72 (Federal Water Project Recreation Act).

Response - This recommendation was not adopted for the following reasons:

a. The additional cost for the ice fisherman access feature must be incrementally justified. Although public fishing access is not currently provided on Conesus Lake, ice fishing is prevalent. Fishermen presently park their cars either along East Lake and West Lake Roads or commercial parking areas of local taverns and restaurants located on the lake. Access to the lake also occurs through private properties, most of which are vacated throughout the winter. With the addition of an access area for ice fishermen, it cannot be demonstrated that this feature will create additional demand for ice fishing nor will it induce the existing fishermen to use the feature. Therefore, any minimal benefits associated with the F&W proposed feature will not likely offset the costs associated to it.

b. The area selected by USFWS as a point of access is a privately-owned trailer park. The trailers in the trailer park during the winter months are primarily unoccupied. This could increase the potential for vandalism if public access were provided through the area.

c. The easements cited in the report along the proposed and existing channels are intended strictly for construction and maintenance access. Public access easements would be required. It is expected that the land owners would be reluctant to grant public access easements due to the potential for vandalism and property damage.

d. The proposed access plans would add costs to the project for several items that would need to be designed and evaluated such as a parking area (gravel, paved), foot path (mud, gravel, paved), handrails, restrooms, footbridge, and lands.

e. From a cursory review of the proposed parking areas, it is likely that acquisition of the lands will be <u>difficult</u>. Area A is located in the front yard and driveway of a large, permanent residence. Area B is a portion of an existing trailer park which would eliminate revenue for the owner from site rental. Area C does not conform to property lines and would require acquisition of portions of several properties.

f. It is suggested that NYSDEC, as the local cooperator, pursue this matter with local interests during the time that the terms of local cooperation for the flood management project are being obtained. They could be implemented independent of the project.

PLAN IMPLEMENTATION

Before construction of the selected plan, several steps must be completed as indicated below:

This final report and final EIS will be reviewed by Corps echelon, other Federal agencies, and New York State officials;

The Chief of Engineers must approve the project and then include it in a list of other small projects awaiting construction funds under the continuing authorities program for the Section 205 Act as amended;

After approval and prior to preparation of design, plans and specifications; the New York State Department of Environmental Conservation will be required to enter into an agreement with the Federal Government. After all lands and easements necessary for construction have been obtained and construction has been funded, bids will then be solicited and a construction contract awarded;

After construction of the project, expected to be completed in one full construction season, local interests will assume the responsibility for project operations and maintenance.

Although no firm schedule is established for completion, once this report is approved as final, New York State requires a minimum of 18 months to acquire the necessary lands, easements, and agreements. That would mean that an optimistic schedule for construction would probably be late in 1983 or early 1984.

Executive Order 11988; Flood Plain Management, dated 24 May 1977, requires that Federal agencies avoid development in base flood plains unless no practicable alternative to such development exists. It is the policy of the Corps of Engineers to formulate projects which avoid or minimize adverse impacts associated with the use of the base flood plain and avoid inducing development in the base flood plain. Since the base flood plain of Conesus Lake is almost completely developed, it is felt that this project will not significantly affect development in the base flood plain. The selected plan for Conesus Lake is a structural solution with lake regulation, but has been determined to be the only practicable alternative. Flood Plain Management policies have been enacted for the area. Therefore, this Executive Order is complied with for the Conesus Lake Study. More information on projected land use for Corps compliance with the Executive Order is included in the Appendix B, Economics.

SUMMARY

Corps studies have shown that there is a need to control the flooding on Conesus Lake, New York. They have also shown that this can best be accomplished through a combination of improving the outlet and developing a lake level regulation plan. The recommended plan would control a 25-year flood on the Conesus Lake Basin. The plan will regulate the lake within the historical maximum and minimum levels. There are a number of environmental and socioeconomic effects of the project. These can best be summarized as the impacts of lake level regulation (biological, recreation, etc.), cultural resources (archaeological sites), and social (impact on trailer residents). The impacts are not all negative, as lake level regulation benefits recreation and may benefit the sport fishery that exists on the lake. A study of the alternative plans has indicated that the recommended plan would be the most desirable.

RECOMMENDATIONS

It is recommended that the selected plan described in this report be used as a basis for preparation of plans and specifications for construction, with such modifications as in the discretion of the Chief of Engineers may be advisable, at a total estimated first cost of $815,000 (March 1981 price levels) consisting of: $661,000 Corps of Engineers and $154,000 non-Federal. This recommendation is made provided that prior to construction non-Federal interests furnish assurances satisfactory to the Secretary of the Army that they will:

a. Provide without cost to the United States, all lands, easements, and rights-of-way necessary for the construction and maintenance of the project;

b. Hold and save the United States free from damages due to the construction, and subsequent operation and maintenance of the project, except for damages due to the fault or negligence of the United States or its Contractors;

c. Accomplish without cost to the United States all necessary changes to buildings, bridges, including approaches, streets, sewers, and utilities, as may be required for construction of the project;

d. Maintain and operate without cost to the United States the completed works in accordance with regulations prescribed by the Secretary of the Army, including maintenance of the pedestrian bridge, access road, and lake level gage located at the water intake plant;

e. Enact and enforce flood plain management regulations, meeting the standards established by the Federal Emergency Management Agency for the National Flood Insurance Program under the National Flood Insurance Act of 1968 and the Flood Disaster Act of 1973;

f. Prevent encroachment of any project required flood channels and ponding areas, which would decrease the effectiveness of the project;

g. At least annually , publicize and notify all interested parties that the project does not provide protection against floods greater than the 25-year flood elevation; and

h. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved 2 January 1971, in acquiring land, easements, and rights-of-way for construction and subsequent operation and maintenance of the project and inform affected persons of pertinent benefits, policies, and procedures in connection with said Act.

GEORGE P. JOHNSON
Colonel, Corps of Engineers
Commanding

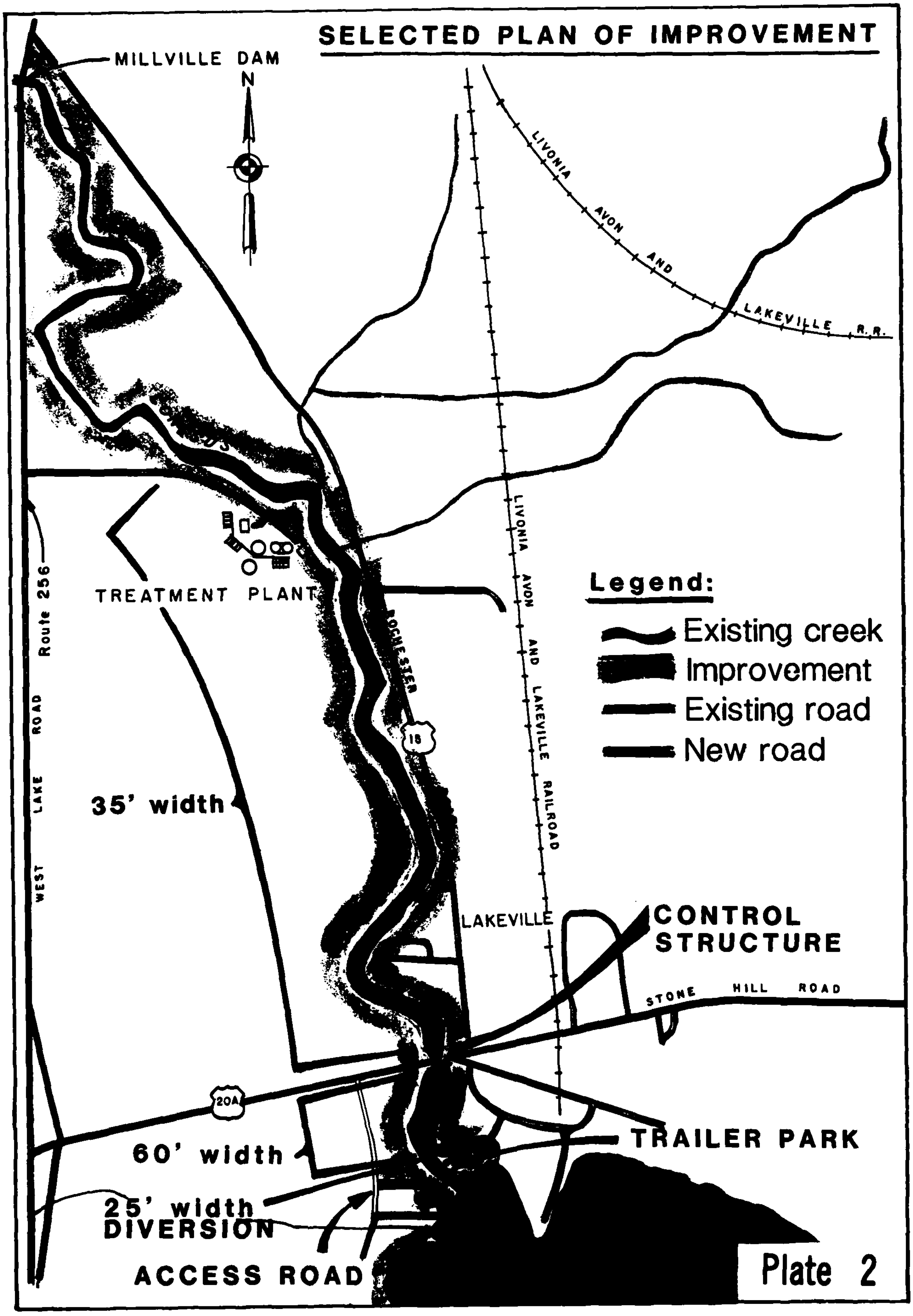

SELECTED PLAN OF IMPROVEMENT
MILLVILLE DAM
N
LIVONIA AVON AND LAKEVILLE R.R.
LIVONIA AVON AND LAKEVILLE RAILROAD
TREATMENT PLANT
ROCHESTER
18
West Lake Road Route 256
Legend:
Existing creek
Improvement
Existing road
New road
35' width
LAKEVILLE
CONTROL STRUCTURE
STONE HILL ROAD
20A
TRAILER PARK
60' width
25' width
DIVERSION
ACCESS ROAD

Plate 2

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

FINAL
ENVIRONMENTAL
IMPACT STATEMENT

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

FINAL ENVIRONMENTAL IMPACT STATEMENT

Proposed Plan for Flood Damage Reduction at Conesus Lake
Livingston County, New York

The responsible lead agency is the U. S. Army Engineer District, Buffalo, NY. The responsible cooperating agency is the New York State Department of Environmental Conservation (NYSDEC).

Abstract: Conesus Lake is located in the Genesee River Basin about 22 miles south of the city of Rochester in Livingston County, NY. The Buffalo District has investigated public concerns of significant flooding along the lake's perimeter. Of the array of alternatives initially investigated, the No Action, Nonstructural, and Lake Level Regulation Plan implemented with either the structural 30-60A or structural 30-60 plans, were selected for detailed study. The No Action alternative is always a possibility. The Nonstructural alternative involved investigation of nonstructural measures and the capability of the existing control structure to regulate lake levels, utilizing a new management plan, for flood prevention. Neither of these alternatives significantly addressed the planning objectives. The Lake Level Regulation Plan consists of a new lake level management scheme which significantly reduces flood damages, while considering required lake levels for recreation, fish and wildlife, water supply, and downstream demands. This regulation plan would have to be implemented with either the 30-60A or 30-60 structural plans. The major differences in the aforementioned plans pertain to social, economic, and environmental impacts that would be sustained in the outlet vicinity. The Lake Level Regulation Plan, implemented through construction of the Structural 30-60 Plan, combined with a mitigation measure for fish spawning habitat, has been tentatively selected, based on its performance in addressing the identified public concerns and its positive contributions to the goals of National Economic Development and Environmental Quality.

If you would like further information on this statement, please contact:

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U. S. Army Engineer District, Buffalo
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Buffalo, NY 14207

Commercial Telephone:
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FTS Telephone
473-2171

Comments on the Draft EIS were received by 21 September 1981.

Note: Information, displays, maps, etc., discussed in the Conesus Lake Main Report are incorporated by reference in the EIS.

SUMMARY

MAJOR CONCLUSIONS AND FINDINGS

The Conesus Lake Study, under Section 205 authority, has determined that there is considerable interest in developing flood protection measures for the lakeshore of Conesus Lake.

Plans developed during the Stage 3 planning process have been evaluated to select those which best meet the planning objectives of the study for both economic and environmental desirability. These factors were examined in light of the desires of potential local project cooperators, agencies, groups, and individuals with expressed concern for the future of the watershed.

Hydrologic and hydraulic engineering and flood damage studies have resulted in the development of a plan of improvement to reduce flooding in areas adjacent to Conesus Lake, NY. This plan includes two conponents: (1) a target level curve to be used for the effective management of lake levels throughout the year, and (2) structural measures at the lake outlet and downstream along the outlet channel.

A target level curve was developed through coordination with interested parties, for use in the effective management of lake levels throughout the year. This curve prescribes desirable lake levels for flood control, recreation, fish and wildlife, and waste assimilative capacity.

Using the HEC-5 computer program model, six basic target rule curves were evaluated. The target rule curves varied only in the month in which different target levels for conservation levels were to be met. The evaluation of the lake management plan using the monthly model was based on meeting the goals of flood control storage, recreation levels, and fishery levels. Six lake management plans were tested on their performance in meeting the target rule curve for each plan. Average monthly elevation and the low and high monthly level for each plan (for each month) were developed and compared to the target rule curve. Each lake management plan was checked for performance during flooding by using the monthly-daily HEC-5 computer model.

Since there was little difference in the economic benefits accrued from flood control for each of the six lake management plans, the selection of the recommended lake management plan was based on the plan that best met conservation needs. The development of the target level curve proceeded with the intent to provide the maximum amount of economically and functionally feasible flood control, while maintaining, preserving, or enhancing - where possible - the other water resource purposes. Various curves were examined leading to the final selection. The procedure for the Selected Lake Level Management Plan would be as follows:

From November through February, maintain a water level of 816.5 to provide for flood control storage. During March, April, and May, allow the lake to rise due to spring runoff to a level of 819.0 for fish spawning purposes and maintain that level through June. After the first of July, draw the

level down to 818.5 for recreation and hold through the month of September, at which time the lake should then be drawn down to reach 816.5 by the end of October. This Selected Lake Regulation Plan would provide flood damage reduction at least to the 25-year event level; also overall recreational facility utilization and flood damage reduction benefits would be substantial.

Structural measures were developed which would provide the necessary outlet capacity to allow for the lowering of the lake levels during periods of sudden heavy inflows and prior to March in any given year. The structural measures include channel modification along the outlet channel and installation of a gated structure in the outlet to allow for increased outlet capacity and more effective regulation of lake levels. Various stream channel and control structure plans were given preliminary consideration. They were the existing control structure and channel, the 30-60 Plan, the 50-120 Plan, the 60 Plan, the 90 Plan, the 110 Plan, and the 30-60A Plan. (A description of these plans can be found in Section 2 - Alternatives.) An evaluation of these plans showed only two plans, the 30-60 and 30-60A, to be economically and hydrologically feasible.

The No Action, Nonstructural, Lake Level Regulation Plan, and the two feasible structural plans, 30-60A and 30-60, were further developed and evaluated for economic, hydrological, environmental, and social acceptability in meeting the planning objectives.

No Action Alternative - The No Action alternative implies that the Federal Government, acting through the Corps of Engineers, would take no action to provide flood damage reduction measures along Conesus Lake. This alternative is always a possibility and must be carried forward through the planning process; therefore, existing conditions without the project would not be altered. Measures, other than those proposed through this investigation, would have to address flooding conditions along Conesus Lake.

Nonstructural - This alternative provides for management of the lake with the existing control structure. This structure was designed primarily to regulate low flows and to provide desirable recreational levels during the summer months. Hydrologic investigations have determined that because of its limited capacities, the existing facility could not be utilized in lake level managment for the purpose of significantly reducing flood damages.

Lake Level Regulation Plan - This plan is comprised of two components, a lake level target curve and structural improvements to the outlet creek. This plan cannot be an effective flood control measure unless both components of the alternative are implemented. The structural measures 30-60A and 30-60 (alternative structural measures) are evaluated separately because they would cause different impacts to the outlet creek area.

Structural Alternative Plans - (30-60A and 30-60) - The 30-60A Plan consists primarily of excavating or modifying the existing channel dimensions along the present channel alignment, removing the existing control structure and constructing a new facility. The work downstream from the Route 20A Bridge would consist of approximately 5,000 feet of channel modification in a channel that is already about 30 feet wide. The 30-60 Plan consists

primarily of excavating an auxiliary channel - 25 feet wide - along an improved alignment directly from the lake through the trailer park to a convergent point with the existing channel approximately 300 feet from the lake. From this point to the Route 20A Bridge, the existing channel would be widened (to 60-foot bottom). The existing control structure would be removed and a new one constructed near the Route 20A Bridge. The work downstream from the Route 20A Bridge would consist of approximately 5,000 feet of channel modification in a channel that is already about 30 feet wide.

National Economic Development (NED) and Environmental Quality (EQ) - The Principles and Standards criteria, and directives relative to plan formulation and evaluation require that alternatives be measured to determine their efficiency in meeting the objectives of the plan formulation process. The NED and EQ Plans are identified in the evaluation process. From a rational point of view, the NED Plan represents the best return on the investment of economic resources needed for construction. The Lake Level Regulation Plan, implemented through construction of the Structural 30-60 Alternative Plan has been identified as the (NED) Plan because it would provide the greatest economic efficiency. The Lake Level Regulation Plan was developed to maximize economic benefits while remaining within the bounds of environmental and social parameters.

The (EQ) Plan is the plan that provides the greatest net positive benefits to the quality of the natural environment. The Lake Level Regulation Plan, implemented through construction of the Structural 30-60 Alternative Plan, combined with a mitigation measure, has also been identified as the (EQ) Plan. Although environmental conditions would be expected to remain the same or to improve slightly with implementation of nonstructural alternatives, the identified EQ Plan would provide more overall environmental benefits.

The Lake Level Regulation Plan, implemented through construction of the Structural 30-60 Alternative Plan, combined with mitigation measure, has been identified as the preferred plan. Compared to the other feasible alternatives, it best addresses the overall public concerns and satisfies the NED, EQ, and other project planning objectives.

Since the preferred alternative would affect navigable waters and wetlands of the United States as defined in the Federal Register (24 December 1980), Guidelines for Specification of Disposal Sites for Dredged or Fill Material, the required Section 404 Reports have been prepared and included in Appendix E of the Final Detailed Project Report and Final Environmental Statement document.

CONTROVERSY AND UNRESOLVED ISSUES

Development of target lake level parameters (flood damage reduction, environmental, recreation, downstream requirements, etc.) was a major issue; resolution of which was necessary for development of the lake level target curves and plan. This issue was addressed and controversies and concerns were resolved to a mutually satisfactory level, through examination of historic lake levels and coordination with pertinent planning agencies, environmental agencies, and public coordination.

Some controversy existed as to the hydrological relationship of Conesus Lake and the New York State Department of Environmental Conservation (NYSDEC) marsh area south of Slicker Hill Road. Preliminary investigation and observation, however, has determined that the marsh conditions are independent of lake level effects until the lake reaches an elevation of about 822. This marsh area was considered at one time as a small retaining basin, but since it is owned by NYSDEC and as of yet their management plan for the marsh has not been fully developed, it could not be effectively incorporated into plan formulation.

Grading modifications to the marsh area located at the southeastern end of the lake were considered as a mitigation or enhancement measure, to compensate for spawning area that might be lost periodically as a result of targeted lake levels (lower than flood damage) or by natural drying out of shallow potholes used for fish spawning and nursery. The effect of this increase of spawning habitat in relation to overall fish production within the lake could not be ascertained. Therefore, based on a lack of specific data, precise desirable grade levels, and other design criteria, as well as possible negative effects to the lake fishery, this measure could not be resolved prior to the release of this report, but is currently still under investigation and coordination between NYSDEC, USFWS, and the Corps (Ref. Section 5).

The Corps of Engineers Hydraulic Design Section has determined that the Millville Dam at the Route 256 Bridge does not contribute to excessively high lake levels on Conesus Lake, and would have no significant impedance to the capabilities of the proposed control facilities. This structure has also artifically created a wetland upstream of the Route 256 Bridge which NYSDEC identified as a valuable resource. Therefore, no modifications will be made to this structure.

Implementation of the Lake Level Regulation Plan would require modification to the existing creek outlet. This would unavoidably disrupt developments and displace people in the vicinity, leading to controversy over benefits versus effects of alternative plans and/or measures. Continuous coordination and development of alternatives and mitigative measures has greatly reduced adverse effects of considered alternatives. This coordination will continue until project construction.

Complete detailed biological mitigation plans (measures) for adverse effects resulting from implementation of the alternative have been resolved. Various measures have been considered and some incorporated into the alternative plan (see mitigation summary, Appendix E).

Although the distribution of Federal and non-Federal costs for the project is fairly well established, the distribution of local shares has not been resolved. Resolution of this issue is determined at the local level and is primarily the responsibility of the local sponsoring agency - NYSDEC.

<u>Lake Level Regulation Plan</u> - In lake level management for desired lake levels for recreation, fish and wildlife, water supply, downstream water

demand, and flood control, an agency would need to be responsible for operation of the control structure in accordance with the developed regulation plan. The agency selected would be determined primarily by the local sponsor of this project - NYSDEC. Likely candidates would be NYSDEC, the Conesus Lake Association, the local Department of Public Works, or the joint planning board. The Lakeville Sewage Treatment Plant personnel might operate the control structure within the plan to assure necessary outflows for plant discharge assimilation needs.

RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS

The Stage 3 detailed plans have been considered in relationship to a number of Federal, State, and local laws and policies. Table 1 lists these laws and policies and the compliance relationship of the considered Stage 3 detailed alternatives to them.

Table 1 - Relationship of Plans to Environmental Requirements Protection Statutes and Other Environmental Requirements

Federal Statutes	Alternative No Action	Alternative Lake Level Management	Alternative 30-60A	Alternative 30-60
Archeological and Historic Preservation Act, as amended, 16 USC 469, et. seq.	N/A	N/A	N/A	N/A
Clean Air Act, as amended, 42 USC 7401, et. seq.	N/A	N/A	Full	Full
Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251, et. seq.	N/A	N/A	Full	Full
Coastal Zone Management Act, as amended, 16 USC 1451, et. seq.	N/A	N/A	N/A	N/A
Endangered Species Act, as amended, 16 USC 1531, et. seq.	N/A	Full	Full	Full
Estuary Protection Act, 16 USC 1221, et. seq.	N/A	N/A	N/A	N/A
Federal Water Project Recreation Act, as amended, 16 USC 460-1(12), et. seq.	N/A	Full	Full	Full
Fish and Wildlife Coordination Act, as amended, USC 661, et. seq.	N/A	Full	Full	Full
Land and Water Conservation Fund Act, as amended, 16 USC 4601-4601-11, et. seq.	N/A	N/A	Full	Full
Marine Protection, Research and Sanctuaries Act, 22 USC 1401, et. seq.	N/A	N/A	N/A	N/A
National Historic Preservation Act, as amended, 16 USC 470a, et. seq.	N/A	Full	Full	Full
National Environment Policy Act, as amended, 42 USC 4321, et. seq.	Full	Full	Full	Full
Rivers and Harbors Act, 33 USC 401, et. seq.	N/A	N/A	N/A	N/A
Watershed Protection and Flood Prevention Act, 16 USC 1001, et. seq.	N/A	N/A	N/A	N/A
Wild and Scenic Rivers Act, as amended, 16 USC 1271, et. seq.	N/A	N/A	N/A	N/A
Etc.				
Executive Orders, Memoranda, Etc.				
Flood Plain Management (EO 11988)	Full	Full	Full	Full
Protection of Wetlands (EO 11990)	Full	Full	Full	Full
Environmental Effects Abroad of Major Federal Actions (EO 12114)	N/A	N/A	N/A	N/A
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	Full	Full	Full	Full
New York State Freshwater Wetlands Act (Wetlands >12.4 acres)	Full	Full	Full	Full
Environmental Conservation Law - Article 15 (Protection of Water)	Full	Full	Full	Full
Local Land Use Plans (See Flood Plain Management EO 11988, also)	Full	Full	Full	Full

The compliance categories used in this table were assigned based on the following definitions:

a. Full Compliance - All requirements of the statute, EO, or other policy and related regulations have been met.

b. Partial Compliance - Some requirements of the statute, EO, or other policy and related regulations remain to be met.

c. Noncompliance - None of the requirements of the statute, EO, or other policy and related regulations have been met.

d. Not Applicable - N/A statute, EO, or other policy not applicable.

FINAL ENVIRONMENTAL IMPACT STATEMENT

PROPOSED PLAN FOR FLOOD DAMAGE REDUCTION AT CONESUS LAKE
LIVINGSTON COUNTY, NEW YORK

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

SECTION 1

NEED FOR AND OBJECTIVES OF THE ACTION

STUDY AUTHORITY

1.01 This report was prepared under authority of Section 205 of the 1948 Flood Control Act, as amended. An investigation to determine the applicability of Section 205 was initiated at the request of Mr. Paul DeMartini, Town Supervisor of Livonia, in a letter dated 23 August 1976, to Colonel Daniel Ludwig, District Engineer, Buffalo. The conduct of this study was approved by the Office of the Chief of Engineers on 20 May 1977 as a result of a Reconnaissance Report dated April 1977.

PUBLIC CONCERNS

1.02 Throughout the course of the Conesus Lake Study, numerous concerns, problems, and needs have been expressed by individuals, governmental agencies, and other interested parties. These concerns were identified primarily through a series of public meetings, workshops, coordination procedures, and related studies. The primary concern expressed by the lake community was for the reduction of flooding and the associated damages, increased costs, and safety hazards incurred by high lake levels. Other concerns expressed were the lack of public access to the lake for recreational purposes, need for improved water quality at the north end of the lake, improved fish and wildlife habitat to include preservation of existing marsh areas, minimization of disruption and dislocation of people and structures, and careful consideration of the cost-sharing responsibilities of the local community. These major public concerns were carefully considered during plan formulation. For more details concerning public views, see SECTION 5 of this Environmental Impact Statement.

PLANNING OBJECTIVES

1.03 Development of the various alternative flood control plans for Conesus Lake considered both the two national water resource planning objectives as defined by the U. S. Water Resource Council and a number of study area specific planning objectives developed in relationship to the aforementioned public concerns for Conesus Lake.

1.04 The two national objectives are:

a. National Economic Development (NED) is enhanced by increasing the value of the nation's output of goods and services and improving national economic efficiency. NED enhancement is achieved through optimum development of water and related land resources. In this objective, the present and projected needs are assessed in terms of the relationship to flood control and related water resource development. The annual costs of the measures for various purposes are compared with the annual benefits in order to evaluate plans on the basis of economic efficiency.

b. The quality of the environment (EQ) is enhanced by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural (archaeological and historical) resources and ecological systems. Historical, wildlife, and scenic values are also evaluated. The impact of improvement measures on wetlands, aquatic life, historic sites, and potential-induced development are also major considerations in selection of a viable alternative.

1.05 The Corps planning objectives developed for Conesus Lake, were to enhance the NED and EQ by the management of water and related land resource needs on a national, State, and local level. The planning objectives listed below, addressed for a 1982 to 2032 period of analysis, form the basis from which alternative plans were developed:

a. Reduce future flood-related losses to natural, cultural, social, and economic resources in the Conesus Lake Basin;

b. Preserve cultural resources in the Conesus Lake Basin which would contribute toward protecting a part of the heritage of Livingston County, NY;

c. Preserve, protect, or enhance the quality of fish and wildlife habitat where possible in the Conesus Lake Basin;

d. Insure recreational opportunities for social enhancement when environmentally and economically feasible in the Conesus Lake Basin;

e. Maintain water access to Conesus Lake for residents living along the outlet;

f. Minimize disruption to the trailer park community located at the outlet of Conesus Lake;

g. Maximize public acceptability to facilitate early consideration;

h. Maintain the marsh upstream of the Route 256 Bridge.

i. Mitigate for predicted project-related loss of northern pike spawning habitat in the wetland known as the Ames parcel located at the southern end of Conesus Lake.

SECTION 2

ALTERNATIVES

PLANS ELIMINATED FROM FURTHER STUDY

2.01 Nonstructural - Nonstructural plans considered were: floodproofing, evacuation, flood warning, flood insurance, flood plain management, and acquisition. Floodproofing, evacuation, and flood warning were determined to be impractical primarily because of the existing extensive development of the shoreline and seasonal occupancy of many of the homes and cottages. Many could be unoccupied in the early spring when most of the flooding occurs.

2.02 The towns that surround Conesus Lake are presently participating in the Federal Insurance Administration's National Flood Insurance and Flood Plain Management Program. Flood insurance would provide compensations for flood damages, but would not significantly prevent damage. Flood plain management would help to control future development, but would do little to protect the existing development. Although these programs will continue in the future, they are generally long-term benefit programs and would not significantly address the immediate problems, needs, or planning objectives.

2.03 Because of the extensive lakeshore development, and land value, acquisition would be extremely expensive and impractical.

2.04 Lake Level Regulation Plan - See Plans Considered in Detail in this Section for development of this plan.

2.05 Structural Plans - In order to develop a plan of improvement to reduce flooding on Conesus Lake and to provide desirable lake levels, as prescribed by the new Lake Level Regulation Plan, various stream channel and control structure modifications were eliminated after preliminary evaluation and are described below:

a. 50/120 Plan - This solution involved the removal of three culverts under the Route 256 Bridge. A new 50-foot wide trapezoidal earth channel with 1V on 3H (slope - 1 foot vertical for every 3 feet horizontal) sideslopes would have been constructed from a point 3,976 feet upstream of the Route 256 Bridge to a point 66 feet downstream of the Route 20A Bridge. The 50-foot channel would have had a length of 5,050 feet, and its alignment would have been along the existing channel. A 4-foot high and 75-foot wide drop structure would have been constructed 66 feet downstream of the Route 20A Bridge. Riprap would have been placed upstream and downstream of the drop structure, the Route 256 Bridge, and the Route 20A Bridge. A new 120-foot trapezoidal earth channel with 1V on 3H sideslopes would have been constructed from the Route 20A Bridge directly to Conesus Lake; its length was estimated to be about 1,070 feet. At the outlet of Conesus Lake, 8-15 feet wide sluice gates, or a combination of gates that would provide a net width of 120 feet would have been required.

b. 60 Plan - This plan involves removal of three pipes under the Route 256 Bridge, and the construction of a new channel with a 60-foot bottom width with 1H on 3V sideslopes. The new channel would have followed the present alignment from a point 100 feet upstream of Triphammer Road Bridge. From a point 50 feet upstream of the Route 20A Bridge, the new channel would have run directly to Conesus Lake. Five 12-foot sluice gates (or their equivalent) would have been built on the outlet at the north end of Conesus Lake. Some modification would have been required for the Route 256 Bridge as well as a new 65-foot wide bridge at Route 20A.

c. 90 Plan - This plan is identical to the 60 Plan, except that the new channel bottom would have been 90 feet wide instead of 60 feet wide and, there would have been five 15-foot sluice gates (or their equivalent) at the north end of the lake instead of five 12-foot sluice gates. A new 65-foot wide bridge would have been needed at Route 20A along with modification to the Route 256 Bridge.

d. 110 Plan - This plan would be the same as the 90 Plan, except the new channel bottom width would have been 110 feet instead of 90 feet, and eight 14-foot sluice gates instead of six 15-foot sluice gates (or their equivalent) would have been required north of Conesus Lake. A new 65-foot wide bridge would have been needed at Route 20A along with modification to the Route 256 Bridge.

2.06 These structural alternative plans were eliminated primarily because: (1) acquisition of land, relocation of utility lines (primarily sewer and water), modification of existing structures (primarily Route 20A Bridge and/or Route 256 Bridge), channel dimensions, etc., would significantly push implementation costs beyond local capabilities and/or acceptable benefit/cost ratios; (2) implementation would significantly disrupt the mobile home trailer community located at the outlet requiring the relocation of many trailers, and disrupt other developments along the creek; (3) implementation would require acquisition of some homes and businesses; (4) implementation would have significant impacts on the natural environment and/or would eliminate the wetland area near the Route 256 Bridge and dam.

WITHOUT CONDITION (NO ACTION)

2.07 No action implies that existing conditions without the project would be expected. In any plan formulation, a no-action plan is always considered. This plan implies that the Federal Government, acting through the Corps of Engineers, will take no action to reduce flood damage under the existing study authority. Should this occur, other entities might contribute to meeting some of the planning objectives previously outlined. Various Federal, State, regional, and local agencies are responsible for implementation and guidance in various aspects of planning and future development. (See the Institutional sections of this report.) Flood plain regulations in the form of zoning ordinances and regulations in the towns are designed to discourage or prohibit construction in the flood plain. Although new development is currently limited by the town, modification to existing structures is unregulated. During these modifications, the value of the structure and contents could increase enough to significantly increase flood damage should

a flood occur. Flood insurance provides some financial protection to victims of flood-related property damage. However, it does not prevent flood losses, but merely compensates the victims. Members of the community are eligible to buy flood insurance under the National Flood Insurance Program, providing they meet the established requirements of the program. These policies are expected to be continued and improved and would eventually result in compensation for existing flood damage losses and redevelopment of the area to low flood damage uses. These, however, are long-term policies and would do little to prevent flood damage to the already existing developments.

2.08 Should the No Action Plan be implemented, it is possible that local governmental or private interests would initiate varying degrees of protection for the developments along the shoreline. However, such an endeavor would probably be lacking in, degree of protection, technical expertise, and adequate funding. Except for this study, there are no known or proposed Federal, State, or local flood control projects in the watershed.

PLANS CONSIDERED IN DETAIL

2.09 The No Action Alternative is described in paragraphs 2.07-2.08. As previously mentioned, this alternative is always a possibility and must be carried forward through the planning process. Measures, other than those proposed through this investigation, would have to address flooding conditions along Conesus Lake.

2.10 Nonstructural - This alternative provides for management of the lake with the exisitng control structure which was constructed in November 1964. The structure is 4 feet high by about 20 feet wide and constructed at the lake outlet by the Conesus Lake Association. The structure consists of sheet piling and wooden stoplogs which are removed and replaced manually. A sluice gate, approximately 2.6 feet wide by 4.0 feet high is located at the east end of the structure and is raised and lowered manually to regulate low flows in the outlet. The NYSDEC permit for the structure states that the stoplogs cannot be put in before 15 April and must be removed by 15 October. A minimum downstream flow of 10.0 cfs must be maintained at all times, primarily for use in waste assimilative capacity at the sewage treatment plant (STP). This structure was designed primarily to regulate low flows and to provide desirable recreational levels during the summer months. Hydraulic investigations have determined that because of its design it could not be utilized in lake level management to significantly reduce flood damages. (See paragraph 2.16.)

Note: This and other nonstructural alternatives may be included under the Without Conditions (No Action) Alternative. Flood Insurance and Flood Plain Management under policies of the State and the National Flood Insurance Program would continue regardless of selected alternatives.

2.11 Lake Level Regulation Plan - This plan consists of a lake level management scheme which will reduce flood damages while considering required lake levels for recreation; levels shown on Table 2 were established in coordination with NYSDEC, the U. S. Fish and Wildlife Service (FWS), and the

Conesus Lake Association (CLA). It is anticipated that the natural fluctuation of the lake level would be used to store excess spring runoff which then could be released gradually to reduce flood damages. Conversely, during years of low precipitation, the lake level could usually be maintained at the desired lake level. A more detailed description and status of the lake level Regulation Plan can be found in Appendix A, Hydraulics and Hydrology.

Table 2 - Desired Lake Levels for Conesus Lake
(Refer to Appendix A for more detail)

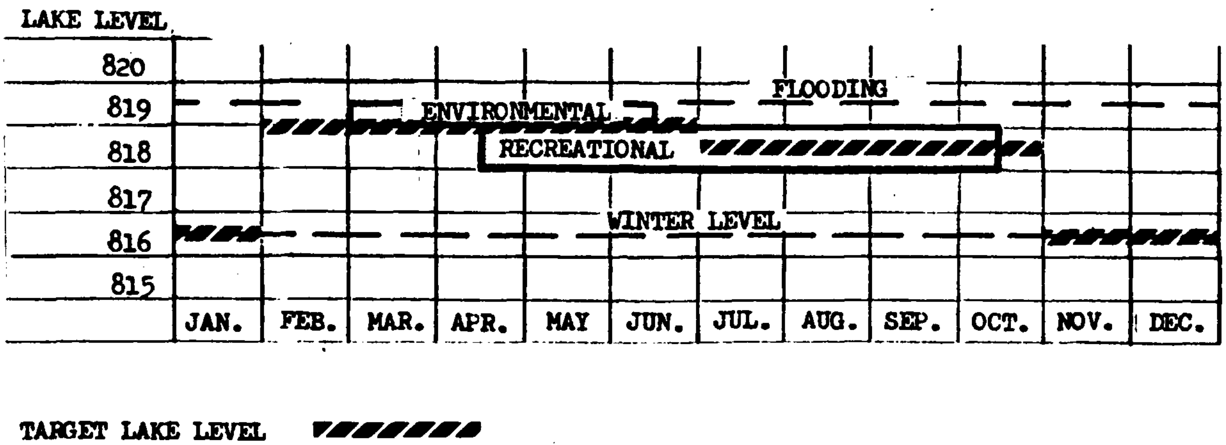
Criteria	Range: Upper	Range: Lower	Period	Remarks
Flooding	819.5	N/A	At all times	Minor damage begins
Recreation	819	818	15 Apr - 15 Oct	Wet Perimeter (819) Mosquitoes (819) Recreational Difficulty (Lakeville) (818)
Environmental	819.5	819	1 Mar through 15 Jun	Fish Spawning (Northern)
Intakes (Municipal)	N/A	815	At all times	Intakes are very deep No anticipated problem
Outflows	-	816.5	At all times	Inadequate outflow capacity below this level
Winter Levels	-	816.5	Nov, Dec, Jan	Provides storage for flood control

2.12 Hydrologic and hydraulic engineering and flood damage studies have resulted in the development of a plan of improvement to reduce flooding of areas adjacent to Conesus Lake, NY. This plan includes: (1) a target level curve to be used for the effective management of lake levels throughout the year; and (2) structural measures at the lake outlet and downstream along the outlet channel, necessary for the implementation of the lake level management scheme.

2.13 The target level curve was developed for use in the effective management of lake levels throughout the year. This curve prescribes desirable lake levels throughout the year for flood control, recreation, fish and wildlife and waste assimilative capacity. While the authorized study purpose is flood control only, changes in lake level for flood control purposes affect other water resource uses; if these effects are adverse, then, alternative measures would be needed to mitigate those effects. Using the HEC-5 computer program, six basic target rule curves were evaluated. The target rule curves varied only in the month in which different target levels

for conservation levels were to be met. The evaluation of the lake management plans using the monthly model was based on meeting the goals of flood control storage, recreation levels, and fishery levels. Six lake management plans were tested on their performance in meeting the target rule curve for each plan. Average monthly elevation and the low and high monthly level for each plan (for each month) were developed and compared to the target rule curve. Each lake management plan was checked for performance during flooding by using the monthly-daily HEC-5 model.

2.14 Since there was little difference in the benefits accrued from flood control for each of the six lake management plans, the selection of the recommended lake management plans was based on the plan that best met conservation needs. The development of the target level curve proceeded with the intent to provide the maximum amount of economically and functionally feasible flood control, while maintaining or enhancing where possible, the other water resource purposes. Various alternative curves were examined leading to the one shown below. The procedure would be as follows: from November through January, maintain a level of 816.5 to provide for flood control storage. During February, March, April, and May, allow the lake to rise due to spring runoff to a level of 819.0 for northern pike spawning purposes and maintain that level through June. After the first of July, draw the level down to 818.5 for recreation and hold through the month of October, at which time the lake should then be drawn down to reach 816.5 by the end of October.



2.15 This Lake Regulation Plan would provide flood damage reduction at least to the 25-year event level; a flood event with a 4 percent chance of occurring each year. Overall, recreational facility utilization and flood damage reduction benefits would be substantial. Total average annual benefits have been estimated at $109,000. During flood events of greater magnitude, flood damage reduction would be significant.

2.16 Determination of Feasible Structural Alternatives - Structural measures were developed which would provide the necessary outlet capacity to allow for implementation of the lake level Regulation Plan. Various stream channel and control structure plans given preliminary consideration were: the existing control structure and channel, the 30-60 Plan, the 50-120 Plan, the 60 Plan, the 90 Plan, the 110 Plan, and the 30-60A Plan. (A description of these plans can be found in paragraph 2.05.) An evaluation of these plans showed only two, the 30-60 and to 30-60A Plans to be economically and hydrologically feasible. Further evaluation showed that the 30-60 Plan was preferred by the local interest over the 30-60A Plan. Further discussion of the reasons behind the selection of the plans can be found in the Main Report.

2.17 Structural 30-60A Alternative Plan

a. The reach of the Conesus Creek from the Outlet from Conesus Lake to the Route 20A Bridge: (See Figure EIS-1.)

(1) With this plan, the existing channel would be widened to a 60-foot bottom width with 1 vertical on 3 horizontal sideslopes from the private road bridge downstream to the Route 20A Bridge; a distance of about 950 feet. The new channel bottom elevations and gradients would remain essentially the same as the existing. Approximately 5,000 cubic yards of material would be excavated by bulldozer or dragline and trucked away to a NYSDEC approved disposal site. The existing control structure would be removed.

(2) A new control structure would be constructed approximately 100 feet upstream of the Route 20A Bridge. It would consist of steel sheet piling and concrete and would be operated by sluice gates. The lower sill of these gates would be located at an elevation of 814.0 (National Geodetic Vertical Datum (NGVD)).

(3) The new control structure was originally proposed to be located near the private road bridge. It was subsequently moved back to maintain creek access to the lake.

(4) Riprap would be required along the bottom and both banks of the creek between the new control structure and the Route 20A Bridge (100 feet). Riprap would also be required along the left bank for about 600-800 feet downstream of the private road bridge. Twelve-inch riprap with a 6-inch graded bedding layer would be used for erosion protection.

(5) With the 30-60A Plan, modified channel dimensions and easement requirements would necessitate the acquisition of approximately 2.3 acres in the reach between the lake and the Route 20A Bridge. This includes the acreage of the existing channel;

(6) The modified channel dimensions and required easements would require the relocation of an estimated 4 to 12 trailers (and associated facilities) which are located in the trailer park near the lake. The trailers affected would be those situated along the creek outlet, particularly those at the upstream end of the outlet. Limited room would be available to pull the

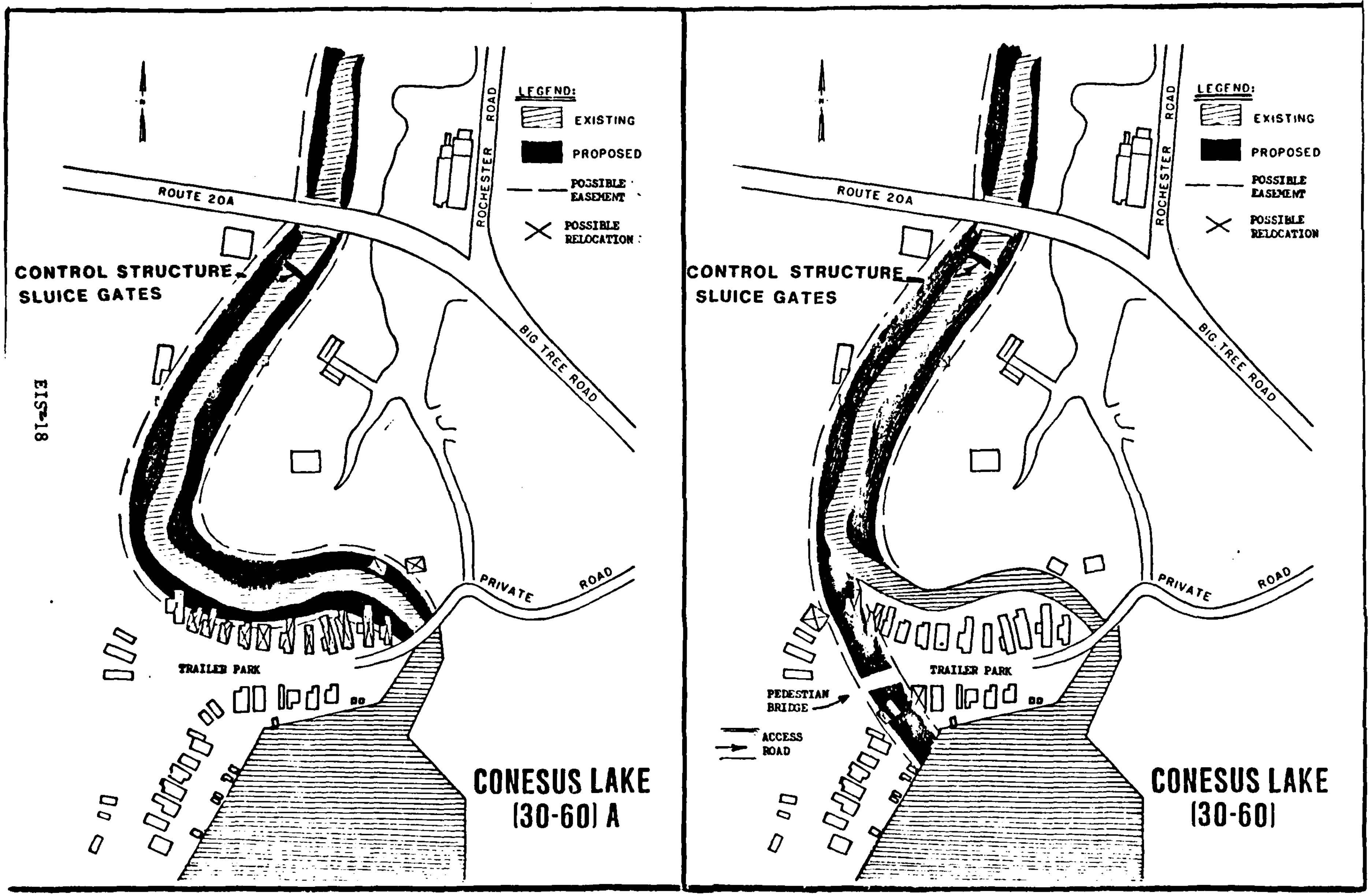

LEGEND:
EXISTING
PROPOSED
POSSIBLE EASEMENT
POSSIBLE RELOCATION
ROUTE 20A
ROCHESTER ROAD
BIG TREE ROAD
PRIVATE ROAD
CONTROL STRUCTURE
SLUICE GATES
TRAILER PARK
CONESUS LAKE
(30-60) A
LEGEND:
EXISTING
PROPOSED
POSSIBLE EASEMENT
POSSIBLE RELOCATION
ROUTE 20A
ROCHESTER ROAD
BIG TREE ROAD
PRIVATE ROAD
CONTROL STRUCTURE
SLUICE GATES
TRAILER PARK
PEDESTIAN BRIDGE
ACCESS ROAD
CONESUS LAKE
(30-60)

Figure EIS-1

trailers further into the trailer park. Although there appears to be some available room in the trailer park, any new sites for trailer relocation would be the responsibility of the property owner. In addition, the two cottages located on the east bank of the creek outlet closest to the lake, a small structure (12 feet X 20 feet) on the west bank, approximately 800 feet downstream from the lake; and a small structure (12 feet X 20 feet) on the east bank, approximately 900 feet downstream from the lake, would have to be acquired or relocated (repositioned).

(7) Land acquisition and relocation would occur pursuant to the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970," Public Law 91-646, which provides for the fair market value of property, moving expenses, and supplemental housing payments;

(8) Construction and relocation efforts in this reach would occur in the early spring to minimize adverse effects to the trailer community. The excavated embankments would be revegetated with woody and/or herbaceous plantings soon after construction to minimize erosion and to reestablish riparian vegetation, wildlife habitat, and streambank cover;

(9) The Conesus Lake perimeter sewer line (Conesus Lake County Sewer) crosses under the existing Conesus Creek outlet stream channel about 400 feet downstream from the lake. This pipe is deep enough so that it probably will not be disturbed during construction. Only minor protective measures might be expected.

b. The reach downstream from the Route 20A Bridge:

(1) The existing channel would be modified to a 35-foot wide (bottom width) trapezoidal channel, with 1 vertical on 3 horizontal sideslopes; from the Route 20A Bridge to a location (just below the sewage treatment plant) about 5,000 feet downstream from the Route 20A Bridge.

(2) Originally, a 30-foot wide channel modification was proposed for this reach; but, by modification to a 35-foot bottom width channel, the channel gradient would remain essentially unchanged, no utility lines would need to be relocated, and a proposed drop structure could be eliminated.

(3) The improved channel would follow the existing channel alignment as much as practical. Minor deviations from this alignment would occur to avoid or minimize the need to relocate sewer and water facilities which cross under or are near the creek. Most of the channelization and excavation work would occur along the west bank. This would preserve the existing riparian vegetation along the east bank and minimize adverse impacts to the residential properties that exist between the creek and Rochester Road;

(4) Approximately 44,000 cubic yards of material would be excavated by bulldozer or dragline from the west bank for this reach (from the Route 20A Bridge to the sewage treatment plant vicinity). Approximately 1,000 cubic yards of material would be excavated from the east bank for this reach. This would be limited to banks that are too steep and would have to be sloped back;

(5) The material excavated from the creek channel in the reach between the Route 20A Bridge and the Route 256 Bridge (Millville Dam) would be distributed and graded in low areas along the west bank of the creek. This material has been tested in 1981 and determined to be nonpolluted when compared to the "National Primary Drinking Water Standards."

(6) The excavated embankments would be revegetated with woody and/or herbaceous plantings soon after construction to minimize erosion and to reestablish riparian vegetation, wildlife habitat, and stream cover;

(7) A minimum outflow of 10 cubic feet per second would be maintained in this reach during periods when the sewage treatment plant operates at full capacity. (DEC permit) A corresponding lesser flow could be maintained at lesser plant capacities;

(8) Hydrologic and engineering investigation has concluded that no modification to the Route 256 Bridge (Millville Dam) is necessary;

(9) Acquisition of approximately 13 acres of land would be required along the west bank in this reach. This would provide an approximate 25-foot wide strip of land along the entire bank to provide room for construction and permanent easements. Access would be provided at/from the sewage treatment plant. About 3 acres of this land consists of present in-stream acreage.

2.18 <u>The Structural 30-60 Alternative Plan</u>

a. The reach of the Conesus Outlet from Conesus Lake to the Route 20A Bridge (See Plate 1 and Figure EIS-1)

(1) The existing channel, from the lake to approximately 600 feet downstream, would remain essentially unchanged. Only minor clearing and snagging would be expected;

(2) In addition to the existing channel, a new channel (approximately 265 feet long) would be excavated along a new alignment directly from the lake, through the trailer park, to a convergent point located along the existing channel approximately 600 feet downstream from the lake. The new channel would have a 25-foot bottom width with 1 vertical on 3 horizontal sideslopes. Its bottom gradient would correspond to that of the existing channel.

(3) Approximately 2,560 cubic yards of material would be excavated to create the new channel in this reach. It would be excavated by bulldozer or dragline and trucked away to a NYSDEC approved disposal site. This disposal site, which would not be a wetland, will be determined by NYSDEC as part of the local agreement. The location of the disposal site will be designated during development of plans and specifications. The new channel would physically divide the trailer park community, but a footbridge would be constructed over the channel to maintain pedestrian access; also a vehicular access road would be constructed from the west. Six trailers would need to be relocated (repositioned). Although new sites for trailer relocation would be the responsibility of the property owner, it appears that there is adequate room in the trailer park to relocate displaced trailers. Since this

portion of the creek would be subject to lake stage levels, creek-to-lake access would be maintained and improved;

(4) Full utilization of the existing channel capacity, was incorporated because it significantly reduces the required dimensions of the newly excavated channel; in turn, reducing land acquisition needs and disruption to the trailer community;

(5) Construction and relocation efforts in these reaches would occur in the early spring to minimize adverse effects to the trailer community. Disturbed soils would be revegetated with woody and/or herbaceous plantings soon after construction, to minimize erosion, reestablish riparian vegetation, wildlife habitat, and stream cover where necessary;

(6) From the point where the new and the existing channels converge, to about 100 feet upstream of the Route 20A Bridge, the existing channel bottom would be widened to a 60-foot width and the sideslopes graded to 1 vertical on 3 horizontal dimensions. This would require approximately 750 feet of channelization and would follow the existing channel alignment. The remaining 100 feet to the Route 20A Bridge would be used for transition of the bottom width and sideslopes to the bridge abutment. The channel bottom elevations and gradient would remain essentially the same as the existing elevations and gradient. Approximately 3,000 cubic yards of material would be excavated by bulldozer or dragline in this reach. The existing control structure would be removed;

(7) A new control structure would be constructed approximately 100 feet upstream of the Route 20A Bridge. It would consist of steel sheet piling and concrete and would be operated by sluice gates. The lower sill of these gates would be located at an elevation of 814.0 (National Geodetic Vertical Datum (NGVD)).

(8) The new control structure was originally proposed to be located near the lake. It was subsequently moved back to maintain creek to lake access.

(9) Riprap would be required along the bottom and both banks of the creek between the new control structure and the Route 20A Bridge (100 feet) and along the left bank (looking downstream) from a distance about 250 feet upstream of the Route 20A Bridge to a distance about 650 feet upstream from the Route 20A Bridge (400 feet). In addition, the first 50 feet from the lake along both banks of the newly excavated channel would also require riprap. Total quantity of riprap to be placed is estimated at approximately 725 cubic yards.

(10) A small structure (12 feet X 20 feet) on the east bank approximately 900 feet downstream from the lake, would have to be acquired or relocated (repositioned). This could probably be relocated in the immediate vicinity. This would be determined in future local negotiations;

(11) Approximately 1.9 acres of land (including the area in the existing channel) would need to be acquired for construction and easements in this reach (between the lake and the Route 20A Bridge). Land acquisition and relocation would occur pursuant to the "Uniform Relocation Assistance and

Real Property Acquisition Policies Act of 1970," which provides for the fair market value of property, moving expenses, and supplemental housing payments;

(12) The Conesus Lake perimeter sewer line (Conesus Lake County Sewer) crosses under the existing Conesus Creek Outlet stream channel about 400 feet downstream from the lake. This pipe is deep enough so that it will not be disturbed during construction. Minor protective measures will be taken to protect it.

b. The reach downstream from the Route 20A Bridge:

(1) The same as for the Structural 30-60A Alternative Plan

THE NED AND EQ PLANS

2.19 The Principles and Standards for Planning Water and Related Land Resources, established by the Water Resources Council in 1973 (revised 1979), require a framework for the systematic preparation and evaluation of feasible plans for addressing problems, needs, concerns, and opportunities under equal objectives of National Economic Development (NED) and Environmental Quality (EQ). See SECTION 1, paragraphs 1.03 through 1.05.

2.20 The NED Plan is the plan that returns the most economic net benefit on an average annual basis. The Lake Level Regulation Plan, implemented through construction of the Structural 30-60 Alternative Plan, has been identified as the NED Plan because it would provide the greatest economic efficiency. The Lake Level Regulation Plan was developed to maximize economic benefits while remaining within the bounds of environmental and social parameters. It would provide flood damage reduction at least to the 25-year event; an event with a 4 percent chance of occurring each year. During flood events of greater magnitude, flood damages would also be significantly reduced. Total average annual benefits have been estimated at $92,400. The Lake Level Regulation Plan could be most economically implemented through construction of the Structural 30-60 Alternative Plan. It has the best benefit/cost (B/C) ratio of 1.37. See Table 3.

Table 3 - Economic Characteristics

Plan	Total Cost	Non-Federal Cost	Federal Cost	Average Annual Cost	Average Annual Benefits	Net Benefits	B/C Benefit Cost Ratio
30-60	815,000	154,000	661,000	73,900	118,400	44,500	1.60

Federal Project Interest Rate = 7-3/8 percent.

Project Life = 50 years.

2.21 The EQ Plan is the plan that provides the greatest net positive benefits to the quality of the natural environment. The Lake Level Regulation Plan, implemented through construction of the Structural 30-60

Alternative Plan has also been identified as the EQ Plan. Although environmental conditions would be expected to remain the same or to improve slightly with implementation of nonstructural alternatives, the identified EQ Plan would provide more overall environmental benefits. Since the existing outlet channel would be retained and a new channel would also be constructed west of the existing outlet, additional habitat would be provided for use by aquatic organisms. Refer to Table 4, "Comparative Impacts of Alternatives" and SECTION 4 - ENVIRONMENTAL EFFECTS.

THE PREFERRED PLAN

2.22 The Lake Level Regulation Plan, implemented through construction of the Structural 30-60 Alternative Plan has been identified as the Preferred Plan. Compared to the other feasible alternatives, it best addresses the overall public concerns and satisfies the NED, EQ, and other project planning ojectives. Generally, this plan provides desirable lake levels for design flood damage reduction, recreation, fish and wildlife, and downstream needs. It is least disruptive and provides the greatest benefits to the trailer park community and the environment; and maintains and improves creek-to-lake, boat and fishery access in the outlet vicinity. Refer to Table 4, "Comparative Impacts of Alternatives," and SECTION 4 -ENVIRONMENTAL EFFECTS.

DIVISION OF PLAN RESPONSIBILITIES

2.23 The following are plan implementation responsibilities:

a. Federal - The Federal Government would design and construct the various features of the project plan selected in this Final Feasibility Report. The Federal cost for control structure facilities, channelization, erosion protection, interior drainage system, and mitigation measures necessary to minimize or prevent adverse environmental impacts. The Corps of Engineers would also periodically field inspect the project to determine if the project works are being properly maintained by non-Federal interests sufficient for its intended functioning. The total Federal first cost for the project is estimated at $661,000.

b. Non-Federal - (NYSDEC) is the non-Federal (local) sponsor, and will be required to enter into a local cooperation agreement normally required by the Corps of Engineers for local flood protection projects, prior to start of construction and in accordance with Section 221 of the Flood Control Act of 1970 and Section 80 of the Water Resources Development Act of 1974. Therefore, the items of local cooperation reflect the spirit of these policies and local interests must furnish assurances to the Secretary of the Army that they will:

(1) Provide without cost to the United States, all lands, easements, and rights-of-way necessary for the construction and maintenance of the project;

(2) Hold and save the United States free from damages due to the construction, and subsequent operation and maintenance of the project, except for damages due to the fault or negligence of the United States or its Contractors.

(3) Accomplish without cost to the United States all necessary changes to buildings, bridges, including approaches, streets, sewers, and utilities, as may be required for construction of the project;

(4) Maintain and operate without cost to the United States the completed works in accordance with regulations prescribed by the Secretary of the Army, including maintenance of the pedestrian bridge, access road, and lake level gage located at the water intake plant.

(5) Enact and enforce flood plain management regulations, meeting the standards established by the Federal Emergency Management Agency for the National Flood Insurance Program under the National Flood Insurance Act of 1968 and the Flood Disaster Act of 1973;

(6) Prevent encroachment of any project required flood channels and ponding areas, which would decrease the effectiveness of the project;

(7) At least annually, publicize and notify all interested parties that the project does not provide protection against floods greater than the 25-year flood elevation; and

(8) Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved 2 January 1971, in acquiring land, easements, and rights-of-way for construction and subsequent operation and maintenance of the project and inform affected persons of pertinent benefits, policies, and procedures in connection with said Act.

2.24 The total estimated non-Federal first cost for project is $154,000. As mentioned previously, non-Federal interests must maintain the project periodically to insure its intended functioning. Vegetative plantings must be cared for; the sluice gates must be inspected, cleared, and checked for proper operation; the channel in the project area cleared of any debris, erosion protection repair, drainage ditches cleared, and the pedestrian bridge maintained.

COMPARATIVE IMPACTS OF ALTERNATIVES

2.25 The following, Table 4 summarizes the overall environmental impacts that could be expected with implementation of the feasible alternative plans. This table includes an assessment of the significance of these impacts. The following Sections, 3 and 4, discuss, in more detail, these impacts, their significance, and probable mitigative measures. Also, Section 2.20 depicts the Summary of Economic Characteristics.

Table 4 - Summary Matrix

Evaluation Criteria	Without Condition (No-Action) Short-Term	Without Condition (No-Action) Long-Term	Lake Level Regulation Plan Short-Term	Lake Level Regulation Plan Long-Term	Control Structure Alternatives 30-60A Short-Term	Control Structure Alternatives 30-60A Long-Term	Control Structure Alternatives 30-60 Short-Term	Control Structure Alternatives 30-60 Long-Term
NATURAL ENVIRONMENT								
Water Quality	0	+	+	+	-	0	-	0
Air Quality	0	-	0	0	-	0	-	0
Endangered Species	0	0	0	0	0	0	0	0
Wetlands	0	+	0	+	-	0	-	0
Benthos	0	+	0	+	-	0	-	+
Vegetation	0	+	0	+	-	+	-	+
Fishery	0	0	0	+	-	0	-	+
Wildlife	0	+	0	+	-	+	-	+
HUMAN ENVIRONMENT								
Flood Protection and Man-made Resources	-	-	+	++	-	+	-	+
Noise	0	0	0	0	-	0	-	0
Aesthetics	0	0	0	+	-	0	-	0
Population	0	0	0	+	-	0	-	0
Displacement, Acquisition, Access	0	0	0	0	--	-	--	-
Employment/Labor/ Income	0	0	0	0	+	0	+	0
Land Use	0	-	0	+	-	0	-	0
Property Value/Tax Revenue	0	-	0	+	0	0	0	0
Housing	0	-	0	+	-	0	-	0
Business/Industry	0	0	0	+	+	0	+	0
Agriculture/ Displacement	0	0	0	0	0	0	0	0
Transportation	0	0	0	0	-	0	-	0
Utilities/Service	0	0	0	0	-	0	-	0
Community Service and Health and Safety	0	-	0	+	-	0	-	0
Education	0	0	0	0	0	0	0	0
Leisure Opportunity (Recreation)	0	-	0	+	0	-	0	+
Community Cohesion	0	-	-	+	-	0	-	0
Institutional	-	-	-	0	-	0	-	0
Community and Regional Growth	0	-	0	++	-	0	-	0
CULTURAL RESOURCES	0	-	0	0	*	*	*	*

Potential Beneficial Impacts

+ moderate significance
++ major significance

Potential Adverse Impacts

-- major significance
- moderate significance

0 no impact (adverse), or insignificant impact (beneficial)
* not known at this time (see Section 4.114)

SECTION 3

AFFECTED ENVIRONMENT

ENVIRONMENTAL CONDITIONS

3.01 Conesus Lake is the western-most Finger Lake and is located in the Genesee River Basin about 22 miles south of the city of Rochester in the towns of Conesus, Geneseo, Groveland, and Livonia, all of which are located in Livingston County, NY. (Figure 1)

3.02 The Conesus Lake Basin consists of an area of 69 square miles, including the lake surface, which drains through Conesus Creek to the Genesee River. The basin is a north-south valley, having an average width of about 5 miles and a length of about 17 miles. Conesus Lake itself is roughly rectangular in shape even though the lake narrows from an average width of 0.6 mile to 0.25 mile for about 1,000 feet, midway along its 7.8-mile length. The surface area of the lake is about 5.0 square miles at water level 817. The southern half of Conesus Lake has an average depth of about 50 feet, while the average depth in the northern half is about 38 feet. A shallow area having a maximum depth of about 10 feet, extends about 2,500 feet from the northern shore.

3.03 The major land use categories represented in the basin are: active agriculture (50 percent), inactive agriculture (10 percent), forest cover (30 percent), and residential (2-3 percent). The remaining 7-8 percent of the basin is occupied by the lake itself. In the area immediately adjacent to the lake, the primary land use is residential - approximately 2,000 homes and cottages adjacent to the lake - with the exception of the southern end of the lake, which is managed by NYSDEC as a fish and wildlife area. (Forest et. al., 1978.) (Livingston County Planning Board, 1971.)

3.04 The natural resources of the lake and shore area have changed due to development. Natural terrestrial vegetation around properties has primarily given way to introduced ornamental species. The existing waterfowl population is small and the lake serves mainly as a refuge for local birds and as a stopover for small groups of waterfowl during periods of migration. The lake supports a limited population of furbearers; such as muskrat, raccoon, opossum, and skunk (White and Alldridge 1980) and the lake and its tributaries support a sportfishery.

3.05 Recreational activities at Conesus Lake include boating, water skiing, skin diving, swimming, and year-round sportfishing. However, the entire lakeshore, except for one State boat launch area and the southern marsh, is in private ownership. Therefore, the lake has little public recreational usage since access is limited (Livingston County Planning Board, 1971).

3.06 In order to assess the area's potential for cultural resources, a literature records search and predictive model development was undertaken for the project area. Zones of low to moderate probibility to contain archaeological sites were identified. Twelve prehistoric and no historic sites were found (Murphy and Silver, 1981).

SIGNIFICANT RESOURCES

3.07 Unaffected Section 122 Guideline Parameters, Section 122 of the River and Harbor and Flood Control Acts of 1970 (PL 91-611) and COE, ER 200-2-2, dated 25 August 1980, requires that at least 17 specific environmental factors, as well as other significant parameters, be identified and evaluated in relation to the proposed action. The following significant parameters; Federal or State endangered and/or threatened species, education, agriculture/displacement; were analyzed in relationships to the proposed project. It was determined that the proposed flood control project will have no significant impact on these parameters. Mineral resources were evaluated and it was determined that this project would have minimal impact on in-the-ground resources. Reference Appendix C of the Final DPR/FEIS document for more detailed information. Affected Section 122 Guideline Parameters and other environmental parameters, that may be impacted by the proposed project, are described in the following paragraphs.

3.08 Water Quality

a. Conesus Lake water quality is designated as Class AA, while all of Conesus Creek (outlet) is classified C and Conesus Inlet is Class D water. This classification system, developed by NYSDEC, was established as a classification criteria - a system based on potential use of the water, with consideration given to the existing land practices. The following are the State's fresh water - surface water classification description designations for Class AA, C, and D:

Class	Best Usage
A/AA	Source of water supply for drinking, culinary or food processing purposes, and any other usages.
C	Suitable for fishing and all other uses except as a source of water supply for drinking, culinary or food processing purposes, and primary contact recreation.
D	These waters are suitable for secondary contact recreation, but due to such natural conditions as intermittency of flow, water conditions not conductive to propagation of game fishery or streambed conditions, the waters will not support the propagation of fish

(Title 6, Official Compilation of Codes, Rules, and Regulations of the State of New York, Chapter X, Division of Water Resources.) Reference section on facilities and services.

b. Recent chemical analyses were done for Conesus Outlet Creek, and the results indicated that the creek reach between the Sewage Treatment Plant (STP) and the Route 256 Bridge does become anoxic at various times of the year. This condition is probably caused by a combination of factors including effluent from the STP, slack water between the Route 256 Bridge upstream to the STP during low flows in the creek, accumulation of large amounts of organic detritus settling out in this slack area, and the decaying

a high Chemical Oxygen Demand (COD) on the waters of the wetland area in this creek reach, which can significantly reduce oxygen content in the water, thus resulting in reduced water quality.

3.09 Air Quality

a. NYSDEC air quality classification for the Conesus Lake area is designated as Level II. This classification system is based on general levels of social and economic development and pollution potentials as pertaining to geographical areas. The Level II category indicates predominately single and two-family residences, small farms, and limited commercial services and industrial developments. (Title 6, Official Compilation of Codes, Rules and Regulations of the State of New York, Subchapter A of Chapter III, Environmental Conservation Law Air Resources.)

3.10 Wetlands

a. Wetlands are found in only two primary locations within the project area. The largest wetland is upstream of the Route 256 Bridge. This wetland is of sufficient area to be covered under Article 24 of the Environmental Conservation Law, Fresh Water Wetlands Act, which is designed to protect and preserve wetland areas greater than 12.4 acres in size. The second significant wetland is located on the lake fringe where Conesus Inlet Creek enters the lake. This area usually floods in the spring, increasing the size and importance to fish and wildlife.

b. Conesus Lake has approximately 15.5 miles of shoreline. The existing shore zone is heavily developed, thereby limiting open and undisturbed natural spaces along the lake. This established dense development along the lake periphery has reduced wetlands along the perimeter of the lake to only a few small remaining scattered areas.

c. There is a large marsh which is currently under the jurisdiction of the Division of Fish and Wildlife, NYSDEC, Avon, NY. This wetland is located south of Slicker Hill Road, which is situated at the south end of the lake. This area is extensively utilized by fish, waterfowl, furbearers, and upland game species and provides both consumptive and nonconsumptive uses for the public (NYSDEC, letter 8 July 1977). However, it lies outside the project area. Concern has been raised by NYSDEC that the Buffalo District's proposed lake management plans could have a deleterious effect upon this wetland. These concerns were resolved through coordination between NYSDEC, USFWS, and the Buffalo District. See Appendix F.

3.11 Benthos

a. Conesus Creek was surveyed to evaluate and inventory the relative diversity of the stream's benthic population (White and Alldridge 1978-1979). Survey results indicated that the invertebrate organism population varied along the entire length of the creek. Species found near the beginning of

the outlet were those normally considered to be "lake species" such as snails and clams, which were only observed at this one location. The area downstream of the outlet to a point upstream of the STP was generally found to be representative of a healthy lake-stream habitat with a wide diversity of benthic life present. Just prior to the STP, benthic fauna becomes degraded and is dominated by oligochaetes and odonatans, with few species of insect larvae found that are usually associated with clean, well-oxygenated water. Downstream of the STP, the area becomes almost totally devoid of benthic organisms, except for Chironominae. This contaminated condition persists throughout the wetland area, with only minor recovery occurring. The wetland has a benthos comparable to that of a highly-vegetated swamp dominated by dragonfly and damselfly naiids and snails of the pulmonate varieties. The area downstream of Route 256, just outside the project limits, shows little recovery in terms of the benthic species present. The aerated riffle zones here were still dominated by oligochaetes (aquatic worms) - a species not usually associated with high water quality (White, Alldridge 1978-1979). This degraded condition of benthic life form is dominant until Conesus Creek reaches Pole Bridge Road, approximately 2 miles downstream of the project limit. In addition, it should be noted that existing conditions for Conesus Lake were not investigated since the proposed project is not anticipated to cause any significant impact to the benthos of the lake community.

3.12 Vegetation

a. There are little, if any, undisturbed terrestrial or riparian vegetated areas remaining within the Conesus Lake project locale. Previously, the lake perimeter was a forested area composed of swamp maple, basswood, black and white walnut, maples, elm, and ash trees (Bloomfield, 1978). These species are rarely present now. Intense development has altered the original vegetative makeup of the lakeshore and it has been replaced by concrete, homes, planted flowers, seeded lawns, planted sugar maples, cottonwood trees, and a variety of introduced landscape plants. Development, though, has not destroyed a unique stand of burr oak that still persists in the Long Point area. This stand has existed throughout the twentieth century.

b. The Conesus Inlet and marsh area at the southeast end of the lake is composed largely of reed-canary grass, goldenrod, and timothy with numerous felled trees and cut branches scattered throughout. Woody vegetation in the area includes red maple trees, silky dogwood, gray dogwood, button bush, and alder shrubs. Areas closer to the lake contain aquatic plants such as broad-leaved cattail, rice-cut grass, bullrush, and bur-reed. Additionally, the inlet area and marsh contain a variety of other herbaceous vegetation, i.e., asters, Queen Anne's lace, smartweeds, and jewelweed.

c. Conesus Creek, from the outlet area at the north end of the lake to the Route 256 Bridge, meanders through some residential properties, abandoned fields, active crop land, and a marsh area. The riparian vegetation from the Route 20A Bridge to upstream of the STP is composed of seeded lawns and other introduced landscape plant species. Large trees, with some having DBH's (Diameter at Breast Height) of 40 plus inches, line the creek bank. Typical tree species found along Conesus Creek include basswood, elm, cottonwood, red

maple, ash, willow, and sycamore. These trees have produced an extensive canopy over the creek, which provides shade over much of its meandering length. Grasses, sedges, rushes, and smartweeds line the creek banks, contributing to the remainder of the major composition of the riparian vegetation in this creek section.

d. Downstream of the STP, the riparian vegetation becomes that of a dense cattail marsh interspersed with open areas of reed-canary grass and jewelweed. Northeast of the creek, the marsh vegetation changed to a "damp meadow community" due to a slightly higher topography. The damp meadow is predominately composed of reed-canary grass, mint, and nettle. The topography continues to elevate, changing the vegetation composition further toward more terrestrial plants. This higher terrain is probably not subject to flooding and is composed of old field herbs, mainly timothy and goldenrod. There is somewhat of an S-shaped curve in the creek between Route 15 and Route 256 downstream of the STP. At this point, the creek is bordered on both sides by a narrow fringe of vegetation that is dominated by smartweeds. This narrow fringe contains permanently-standing water all year round and also contains bulrushes and sedges as well. Extending out from this narrow fringe is a wet meadow community that is dominated by rice-cut grass. This fringe and wet meadow community extends from the S-curve to the Route 256 Bridge. (White and Alldridge 1978-79).

e. The aquatic submerged and floating vegetation in the Conesus Outlet Creek from the Route 20A Bridge to Route 256 Bridge consists of wild celery, water milfoil, and various species of pond weeds. Extremely large quantities of free-floating duckweeds cover the marsh area downstream of the STP. Growth is so intense at times here, that sunlight is almost completely prevented from penetrating through the surface of the water due to the thick mat formed by the two species of duckweed - lesser and greater.

f. Existing published data on the aquatic vegetation of Conesus Lake is limited. As of the date of this document, only two known detailed surveys are available; Meunscher (1927) and Forest et. al. (1977); which report the vegetation surveys performed. Submerged plants include approximately 12 species of pond weeds, coontail, wild celery, waterweed, milfoil, water stargrass, and bladderworts. Emergent and floating plants found are members of the water plantain family, numerous sedges, cattails, smartweeds, water lilies, duckweeds, and various other species. These plants are representative of the flora that are common to the Finger Lakes region.

g. The more common species; water milfoil, wild celery, water stargrass, and coontail; have been associated with lakes that have reduced flora caused by heavy plankton growth and large quantities of pollutants. (Reference U. S. Fish and Wildlife Service Coordination Act Report, Appendix F, for scientific nomenclature and Bloomfield, 1978.)

3.13 <u>Fishery</u>

a. <u>Conesus Outlet Creek</u>

(1) Conesus Creek, the only outlet for Conesus Lake, is a shallow (usually less than 2 feet deep), narrow, meandering, and usually sluggish

flowing stream. Presently, existing regulation tries to maintain a minimum flow of 10.0 cfs for waste assimilation, but at extremely low lake levels, this regulation is sometimes difficult to maintain. Both creek banks are bordered by a diversity of woody and herbaceous riparian vegetation and, since the creek rarely exceeds 20 feet in width, it is almost entirely covered with a shade canopy from overhanging trees and shrubs. There are few riffles or deep pool areas, and some rooted aquatic plants are found growing in the variable substrates of silted sands, silts, gravel, and cobbles dispersed along the length of the creek bottom.

(2) Approximately 30 species of fish were observed in Conesus Outlet Creek. The fish fauna of the outlet creek adjacent to Conesus Lake is dominated by young species of the family Centrarchiade, i.e., rockbass, sunfish, and smallmouth bass. These species are usually associated with Conesus Lake and seem to be using the area as a nursery and feeding zone, whereby they feed on killfish, silverside minnows, shiners, and dace, which inhabit this section of the outlet creek. Present conditions show killfish and silverside populations dominating the forage fish population in this area, which is probably due to the fact that their numbers are continuously reinforced from large lake populations (White and Alldridge 1978-1979).

(3) The outlet area, downstream from the lake, in the upstream vicinity of the STP, is dominated by "rough" fish species such as carp, white suckers, and some sunfishes. However, the creek area located further downstream directly below the STP contains a fish fauna that is depauperate or almost totally nonexistent of even "rough" fish species. This degraded fishery persists downstream into the impounded wetland behind the Route 256 Bridge. This area is practically devoid of fish fauna, except for minor concentrations of "rough" fish.

(4) This impounded wetland is essentially cut off from the downstream area by culverts. This condition results in an effective barrier to any upstream fish migrations. In addition, the present impounded wetland creates a situation, that when combined with slack water, STP loading, and other chemical and physical parameters, can lead to a condition where oxygen levels drop well below tolerable limits necessary for the survival of fish species.

(5) The creek area, just downstream of the Route 256 Bridge, contains a large pool that supports a diverse fish fauna. This fact indicates that creek conditions have improved from the degraded upstream conditions and the outlet creek has established a "recovery zone" in this location for the fishery. The recovery process continues from downstream of the Route 256 Bridge until the creek passes under Pole Bridge Road. Throughout this reach, the fishery improves in diversity, numbers, and species until at Pole Bridge Road, the established fishery consists of a population that is usually associated with a well-oxygenated, clear, clean, small creek.

b. Conesus Lake

(1) The predominant fishery of Conesus Lake is composed of walleye, yellow perch, smallmouth bass, largemouth bass, sunfishes, and northern pike.

These species vary in their population sizes, habitat requirements, and relative significance to the existing lake fishery.

(2) The walleye is considered an important sportfish and has been stocked by NYSDEC at various times over the preceding decade. This stocking program involved the release of eggs and yolk-sac, which are early stages in the developmental process of the walleye. Investigation to date seems to indicate that this stocking program has had little impact on the total walleye adult population of the lake. Data shows that the survival rate of the larval walleye is poor at this life stage and could be attributed to the large population of yellow perch present in the lake which feeds on the larvae.

(3) Natural walleye production does exist in the lake and some tributaries. Studies have shown that migrations and spawning occurs in Conesus Inlet Creek and South McMillian Creek. However, from present data, the number of spawning individuals observed to be utilizing the creek as compared to the NYSDEC total estimated lake population is relatively insignificant. The fertile eggs were found to be washing downstream, in the inlet, indicating these areas have had successful spawning. Also, lake spawning investigations showed only minimal walleye production is occurring at gravelly shoal areas dispersed throughout the lake. These gravel shoals are less vegetated than other locations within the lake, thus reducing the habitat requirements of yellow perch and allowing for some added production of walleye. These two aforementioned locations seem to be allowing natural projection to occur within the lake, but overall species production seems low.

(4) Centrarchids are a group of fish that include smallmouth bass, large-mouth bass, rock bass, sunfish, pumpkinseeds, blue gill, and crappies. The majority of these species are found to utilize the shoreline of Conesus Lake for spawning, nursery area, and foraging, with the exception of crappies. Crappies have not been found in any significant numbers in Conesus Lake. These various species were found to utilize similar depths for spawning (1.5-12 foot range), but each species did have separate and specific requirements for nests utilized during spawning. Primary requirements for nests seemed to be based on different substrates present along the lake shore.

(5) The remaining fishery of Conesus Lake is dominated by northern pike. Pike utilize shallow, flooded, vegetated marsh habitats for spawning. One such area is located at the southern end of Conesus Lake, east of where Conesus Inlet Creek joins the lake. This area usually floods seasonally in the early spring and has been documented as a northern pike spawning area (White and Alldridge 1978-1979). However, actual yearly production and/or survival rates from the marsh are not readily known. In addition, pike were observed to migrate upstream in the Conesus Inlet Creek. The pike then moved into the marsh areas present in the wildlife management zone managed by NYSDEC. This wildlife management zone contains a water level that is more stable than the previously-mentioned marsh area and allows growth and development of the pike to occur through the entire summer. This area would seem to provide a more stable physical environment necessary for their successful reproduction and development.

3.14 Wildlife

a. There are three general wildlife habitat locales within the Conesus Lake study area. These areas are Conesus Inlet, the lake and shoreline, and the outlet creek with associated marsh upstream of the Route 256 Bridge.

b. The inlet area, which usually floods for brief periods of time during late winter and early spring, but is predominantly dry for most of the year, is not significantly utilized by wildlife species. Field investigations (White and Alldridge 1978-1979) revealed very low numbers of muskrat lodges, bank dens, or actual sightings of species. Similar observations did not show any significant use by any other furbearers. One mink was observed in the outlet creek and in the South McMillan Creek area. Mink are less dependent on marsh areas and rely more on streams and creeks for food and extension of their range. In addition, surveys indicate that this area is used only marginally by waterfowl for either nesting or feeding.

c. The outlet area and marshland upstream of the Route 256 Bridge, which contains a large cattail stand, was investigated to determine the utilization by wildlife species (White and Alldridge 1978-79). Observations showed that this cattail marsh does not retain a minimal water level throughout the year and, in fact, dries up at certain periods. Field studies did not show any significant signs such as lodges or dens that would indicate this area supports large quantities of muskrats or other furbearers. Also, field surveys concerned with waterfowl showed low usage of the outlet creek and marsh. There were only four different species of waterfowl recorded, which totalled less than a dozen individuals for the study period.

d. Conesus Lake has lost most of its shoreline marshes to extensive development. This lack of suitable wildlife habitat contributes to the fact that no significant concentrations of furbearers were observed. In addition, the paucity of marshes has probably contributed toward a reduction in suitable nesting habitat for waterfowl. There are, however, local populations of mallards and domestic ducks that do nest in private lawns and under existing docks found around the lake. Survey results from field observations recorded very few nests or new broods. The waterfowl that was recorded in the lake probably utilized it more as a stopover for short periods of time during migrations.

e. Other wildlife within the watershed include mammals - white tail deer, woodchuck, raccoon, opossum, skunk, weasel, coyote, porcupine, rabbits, beaver, mink, various mice, shrews, star-nose mole, meadow vole, bats, squirrels, and chipmunk. These species, although inhabiting the basin, probably utilize the wildlife habitat upstream of the inlet in the project locale where there is less development and disturbance.

f. Amphibians and reptiles are well represented in the project area. There are approximately 30 different species that are presently known to exist here. Examples include: spring peeper, pickerel frog, bull frog, slimy salamander, red-backed salamander, spotted salamander, midland painted turtle, common snapping turtle, and northern water snake. (Reference USFWS letter, dated 5 Nov 1981 - Appendix F).

3.15 Flood Protection and Man-Made Resources

a. The area immediately encompassing the lake is approximately 75 percent developed. The primary existing land use is residential with some 2,000 homes and cottages closely surrounding the lake perimeter. This use is split about evenly between cottages and permanent housing with both types being available for rental. The dominant commercial activities are marinas and related facilities, restaurants, and taverns. There are no schools or other such public facilities in the lake flood plain.

b. The principal water-related problem in the study area is flooding, which is primarily due to the insufficient outflow capacity of the existing outlet. The lake outlet drains to the north through a wooded, marshy area, that has received little maintenance and contains numerous natural and artificial constrictions. The limited capacity of the outlet during peak discharges contributes to high lake levels which floods property bordering the lake.

c. Spring flooding is a frequent occurrence causing damage to docks, retaining walls, grounds, cottages, and homes. Flood damage begins at a level of about 819.5 on Conesus Lake (the normal lake level has been identified as 817 on the U. S. Geological Survey maps). The Agnes flood in 1972 reached a level of about 822.5 and affected about 1,300 cottages and homes around the lake. (Corps of Engineers)

d. Flood damage reduction measures to date - have consisted primarily of individual efforts and community emergency assistance. There was no formal regulation of the levels of Conesus Lake until November of 1964, when a steel pile overflow weir with movable stop logs and a low flow sluice gate was constructed about 1,000 feet from the lake mouth by local interests (CLA). This structure, however, was designed primarily to regulate low flows and to provide desirable recreational levels during the summer months. Because of its design, the weir has only limited effects on the lake level and reduction of flood damages.

e. A detailed damage survey was conducted by the Buffalo District Corps of Engineers during March and April of 1979. The results of this damage survey were used as a basis for determining average annual flood damages from estimated future flood occurrences and the average annual benefits that could result from considered plans of improvement. Average annual flood damages of $64,000 (including residential, commercial, public, and other) were determined using lake stage frequency curves and stage damage curves. For details on this see Appendix B.

3.16 Noise

a. The entire lake perimeter is bordered by roads, subjecting the project area to varying degrees of both residential and commercial traffic sounds. In addition, residents indicate that, due to increased activities at the lake during the warmer weather (i.e., fishing, boating, amusement parks, population influx), noise levels increase. This increased activity is not limited to the warmer months. Winter activities generate noise, but to a lesser degree.

3.17 Aesthetics

a. The Livingston County Recreation Plan identifies two potential roadside rest areas along the Conesus Lake Shoreline. One is on State Highway 256 (West Lake Road) in the town of Geneseo. The site is at the point on the highway overlooking Conesus Lake to the east. The other site is located off State Highway 255, about 1/2 mile south of its intersection with U. S. 15 in the town of Conesus. This site provides an excellent view of the southern end of the lake.

b. The shoreline profile is characterized by continuous tight clusters of mostly houses, cottages, and mobile homes, most of which are well maintained. There are also numerous shoreline protection and access structures consisting primarily of walled platforms, small inlets, ramps, docks, and piers. This intense development hinders unobstructed views of Conesus Lake except for residences along the immediate lake shoreline perimeter, although some view of the lake is afforded to the public from intermittent clearings and openings from the roads that parallel the lake, and from open access areas along and at both ends of the lake (parks, wetlands, fields).

3.18 Population

a. Conesus Lake is located within the boundaries of four townships; Conesus, Geneseo, Groveland, and Livonia. Table 5 provides estimated population data, and projection data. These communities are predominantly white (97.8 percent),with an average median age for the four townships of 27.4 with 9.4 percent of the population, 65 years of age or older.

Table 5 - Population

	1970	1980	1990	2000
New York State	18,241,266			
Rochester SMSA	961,516			
Livingston County	54,041	59,600	66,200	72,600
Conesus (T)	1,533	1,800	1,800	2,000
Geneseo (T)	7,278	8,800	9,300	9,800
Geneseo (V)	5,714	7,100	7,200	7,200
Groveland (T)	3,004	2,800	3,200	3,500
Livonia (T)	5,304	6,000	6,700	7,500
Livonia (V)	1,300	1,400	1,400	1,700
Four-town Area	17,119	19,411	21,011	22,811

Sources: NYS - SMSA 1974 NYS - Economic Development Board, 1975

b. The population of the drainage basin is primarily located in the villages of Lakeville, Livonia, South Livonia, Conesus, Webster's Crossing, Scottsburg, Union Corners, and around the perimeter of Conesus Lake. The area adjacent to the lake contains over 2,000 homes and cottages and accounts for 80 percent of the basin's population. The population figures for this area vary seasonally from a low of 2,500-3,000 in the winter to over 6,000 in

summer, with a high of over 10,000 on holidays and weekends. (Forest et al., 1978). People living along the perimeter of the lake are a mix of year-round, primarily long-term residents and those who own or rent summer cottages.

3.19 Displacement of People, Land Acquisition, and Access

a. The area that would be immediately impacted by the proposed structural measures would be in the immediate vicinity of the Conesus Creek Outlet from the lake to the 20A Bridge and from the 20A Bridge to the Route 256 Bridge or Millville Dam. A number of cottages, and trailer homes are situated along the existing outlet channel in the vicinity from the lake to the Route 20A Bridge. A representative of the Conesus Lake Association for the area indicated that the trailer park has been situated there for at least 20 years and that the trailer park is owned and operated by a local developer. The occupants of the trailer park are seasonal residents who own the permanently located trailers and lease the spaces each year from 15 May to 15 October. During this period, there are generally two to three occupants per trailer, many of whom are middle aged or older and most have had a summer residence there for an excess of 10 years.

b. Public use of Conesus Lake is very limited. The majority of the shoreline is privately owned and there is one public boat launching facility at the lake. There is a bait and boat rental business located on the outlet creek near Route 20A. Small boats (12 feet and under) can be rented or launched from the establishment and access to the lake provided by this business is relatively unhindered.

3.20 Employment/Labor/Income

a. As of 1970, service industries and manufacturing concerns accounted for approximately 57.1 percent of all employment in Livingston County. (New York State Basic County Statistics, 1970.) For the towns of Conesus, Geneseo, Groveland, and Livonia within those boundary Conesus Lake is located, the civilian labor force (population 16 years and over) consisted of some 6,384 persons in 1970. Of these, an average of 96.9 percent were employed, and 40.3 percent were female. Of those employed, a higher percentage were professional - technical (18 percent), clerical (14.8 percent), and service workers (15.3 percent) with an average median family income of $10,685. (New York State, Standard Metropolitan Statistical Area, 1974.)

b. A great majority of the lake perimeter residents commute to Geneseo, Avon, Rochester, and elsewhere. There are many professionals (lawyers, doctors, dentists) around the lake, and the growth of the State University College at Geneseo and the flight from urban Rochester by skilled craftsmen and others, have significantly augmented the pool of those who could afford the inflated prices. Their personal incomes during recent times has kept pace with the rise of land values in the project area. (Forest, et al., 1978).

3.21 Land Use

a. The major land use categories represented in the Conesus Lake basin are: Active agriculture (50 percent), inactive agriculture (10 percent), forest cover (30 percent), and residential (2-3 percent). The remaining 7-8 percent of the basin is occupied by Conesus Lake itself. In the area immediately adjacent to the lake, the primary use of land is residential. The major exception to this residential use is the marsh area at the southern end of the lake, which is managed by the NYSDEC as a fish and wildlife area. (Forest et. al., 1978). (See Figures B-3 and B-4 in Appendix B)

3.22 Property Value/Tax Revenue

a. The activity most susceptible to flooding is the residential land use at the lake shore, especially those homes or cottages situated at the lower elevations or near the Conesus Outlet. Many of these are located on the lake shore in the floodprone area. A survey of tax assessments done by the Conesus Lake Association in 1980 indicates the following assessed value of property in the floodplain by town:

Conesus	$12,053,200
Geneseo	13,600,100
Groveland	7,901,100
Livonia	32,324,200
Total	$65,858,600

This total includes homes and cottages (both year-round and seasonal), mobile homes, and businesses. The State has just gone to 100 percent assessment so this represents the current full assessed value of these properties. (Reference paragraph 3.23b)

3.23 Housing and Residential Development

a. In 1970, there were 5,198 housing units in the towns of Conesus, Geneseo, Groveland, and Livonia. Of these, 3,964 were occupied (75 percent owner-occupied) and 753 were seasonally vacant. The majority of the year-round structures are old: 57 percent were built in 1939 or earlier, with only 26 percent built later than March 1960. Virtually all of these (92.5 percent) had all plumbing facilities and 80.6 percent had central heating or built-in electric units. Of the year-round housing units, 78.8 percent were single housing, 43.0 percent of which were moved into between 1965 and March 1970. The median value for owner-occupied single family structures was $18,325 in 1970. (New York State, Standard Metropolitan Statistical Areas, 1974)

b. "Although the market price of houses around the lake is substantially above the area level (realtors estimate 50 percent above), no shortage of buyers is apparent. The brisk rental business of cottages to winter occupants from the college does not appear to be declining because of increased purchases for permanent residence. Some houses are even being purchased as rental investments. Summer rentals, however, are relatively few in number, at approximately $150-$200 a week." Conspicuously, new housing is being

built in the second or third tier, back of the saturated perimeter of the lake and a noted trend for the last two decades has been increasing remodeling and the conversion of summer residences to permanent. (Forest et. al., 1978) "Lake frontage land is now worth at least $150 a foot, and $250 appears to be more typical. Most older residents have been able to hold their property." (Forest et. al., 1978)

3.24 Business and Industry

a. The two most significant activities in the Conesus Lake basin for over the last 150 years have been farming and residential/recreational related. Businesses and institutions established in the lake vicinity cater and support primarily these activities. Marinas, sporting goods, motel, tavern/restaurant, farm related, and service businesses are most common. Few significant processing industries have survived long in the basin, and no large scale ones have ever existed there. Some of the past industries that have occurred included the production of potash for fertilizer, lumbering, peat processing, ice cutting, and milk processing. In addition to these extended activities, others have come and gone rapidly. (Forest et. al., 1978) Wheat, however, is still shipped yearly from the village of Livonia and the Livonia, Avon, and Lakeville Railroad freight, not only wheat but also tank cars of corn syrup and sugar cane to and from the Western New York Syrup Corp., an industry established in Lakeville in 1970. A foundary, the Progressive Foundries, Inc., established in 1947, is also operational in Lakeville and employs about 35 persons. (Forest et. al., 1978)

b. A bait and boat rental business is located on the corner of the Conesus Creek Outlet and Route 20A in the vicinity of the existing control structure. The existing control structure maintains sufficient creek levels up to the structure so that small boats (12 feet) may be rented or launched. Access to the lake for these boats is relatively unhindered, except for a low level road access bridge near the lake.

3.25 Transportation

a. The major highway arteries in the Conesus Lake area are Routes 20A and 15. Route 20A runs east and west through Geneseo, Lakeville (at the northern end of the lake), Livonia, Livonia Center, and Honeoye. Route 15 runs north and south through East Avon, south to Triphammer Road, south along the east bank of the Conesus Outlet Creek (proposed construction area), to Lakeville where it joins Route 20A and then runs south again through Conesus. Conesus Lake is also bordered to the east by East Lake Road, to the south by County Road No. 8, and to the west by West Lake Road (Route 256). A myriad of secondary roads provide access to the various residences and facilities along the lake.

3.26 Utilities/Services

a. Water Supply - Conesus Lake serves as the source of water for several communities in Livingston County. The villages of Avon and Geneseo, the hamlets of Lakeville, East Avon, Retsoff, and York, and individual households surrounding Conesus Lake all rely on the lake for water supply. Avon,

Geneseo, and Lakeville maintain their own pumping facilities on the lake. Both Avon and Geneseo are authorized to withdraw a maximum of 3 mgd. East Avon and the York complex purchase their water from Avon and Geneseo, respectively. (Forest-1978; LCPB Public Utilities and Services-1971; COE-Genesee River Basin Study)

b. Sewage Treatment - An advanced STP was built on the Conesus Outlet about 4 kilometers north of the lake. An interceptor sewer now surrounds Conesus Lake. Effluent from the villages of Livonia and Lakeville and all waste in the vicinity of the lake was diverted from the lake basin in 1973 and treated in the new facility (teriary treatment) before discharge into Conesus Outlet Creek. (Forest, 1978) This facility requires a minimum creek flow of 10 cfs for the outflow at peak operation. Avon and Geneseo maintain their own treatment plants.

3.27 Community Service/Health and Safety

a. The County Sheriff's Department is the primary full-time source of police protection in the towns and the area surrounding Conesus Lake. The Sheriff's Department also runs the boat patrol initiated by the Conesus Lake Association. The Conesus Lake Association has also initiated a neighborhood watch program to help protect permanent, seasonal, and weekend properties on the perimeter from theft and vandalism.

b. Fire service is provided by the Groveland, Geneseo, Conesus, Livonia, and Lakeville Fire Departments and has been described as excellent service by a Conesus Lake Association representative. Ambulance Service is provided by Livonia and Geneseo. Lakeville also has a rescue boat and handles ice fishing accidents.

c. Although major flooding problems are related primarily to structural and furnishing damages, severe flood conditions can produce increased health and safety hazards, some of which might include: drownings, structural failures, electrocution, sewage and drainage backup, and water contamination. In addition, related community services (police, fire, health, etc.) would also be needed.

3.28 Leisure Opportunities (Recreation)

a. The Conesus Lake area offers a wide array of both passive and active recreational opportunities, including: vacation home sites; year-round fishing, boating; water skiing; skin diving; swimming; geologic and historic sites; scenic roadside rest areas; unique natural communities; a steam-powered excursion train (23 mile scenic excursion trip); and the Long Point Amusement Park.

b. The fishery of Conesus Lake is a diverse and impartial recreational resource. It is estimated that 107,500 angler days were spent at Conesus Lake during the 1975 season. (Brown 1975, NYSDEC 1977) Northern pike contributes significantly to the total and is considered an important resource of the lake along with other sought-after gamefish species. In 1975, approximately 320,000 dollars were expended by fishermen in the pursuit

of game fish at Conesus Lake with approximately 25 percent of the fishing activity occurring during the winter. (Brown, 1975) Adequate ice fishing public access is a noted problem in the vicinity. (NYSDEC)

c. Presently, a number of marine service facilities, some private launch and rental facilities, and the New York State operated launch on the east side of the lake provide (limited) access to lake boating. The majority of people that do use the lake for boating own property adjacent to the lake and maintain their own private docking facilities. A recent Conesus Lake Association boating survey indicates that there are approximately 2,000 motor boats of lengths varying from 10 feet to 25 feet and from three-quarter HP to excess of 200 HP. There are also about 1,000 sailboats that regularly use the lake. (Conesus Lake Association letter - 27 October 1979)

3.29 <u>Community Cohesion</u>

a. (Reference the Institutional, Population, Community Growth and other pertinent sections.) Although the Conesus Lake locale is technically divided between four townships (Geneseo, Livonia, Conesus, and Groveland) which share its shoreline, the lake perimenter developments may be considered as forming one lake community partially distinct from these towns, due to their common lakefront environment and the identification of the residents with the Conesus Lake vicinity. (See Section on Institutional Analysis.) There is an apparent strong cohesive force of identification among those forming the lake community itself (particularly those with shoreline property) and a growing concern, relative to future increased development.

b. The Conesus Lake Association (incorporated in 1932) has rather effectively provided the limited social structure which most residents appear to have desired. It resembles the urban neighborhood associations which begun to form a generation later in performing certain quasi-governmental functions. The Fourth of July celebration which it organizes is characteristic of other lakes, but its initiative on a number of substantial community problems is impressive. The Association can be credited as the vehicle which obtained an effective sanitary inspector before other lakes, also fire hydrants, safety regulations, and lake level control. It stood against filling of shore wetlands and for the perimeter sewer. The Association considered a control program for aquatic "weeds" in 1968, and accepted a recommendation against action. (Forest et. al., 1978)

3.30 <u>Institutional</u>

a. Many governmental and private agencies are concerned with developments pertaining to Conesus Lake and vicinity. (Reference Institutional Inventory, Appendix F.) The primary agencies involved with this project are: (1) Corps of Engineers, Buffalo District; (2) New York State Department of Environmental Conservation; (3) Department of the Interior - Fish and Wildlife Service; (4) the towns of Groveland, Geneseo, Conesus, Livonia; (5) Livingston County; (6) the Conesus Lake Association; (7) individuals and others.

3.31 Community and Regional Growth

a. (Reference the Institutional, Population, and other pertinent sections also.) The most significant activity in Livingston County for over 150 years has been agriculture. New York State has and still recognizes the Finger Lakes Region which includes Livingston County as one of the most important farm areas in the State. Historic land use trends have altered correspondingly from forest to agriculture to developing urbanization. In the Conesus Lake Basin, although approximately half of the area is still agricultural, land in cultivation has decreased steadily in the second half of the twentieth century, while total productivity has increased. The principle sources of income being dairy products, field crops, and livestock products.

b. From the developing manufacturing center aspect, the county's proximity to Rochester and Monroe County has been important. Livingston County is part of the Rochester Metropolitan Area. The city of Rochester is the center of industrial activity, ranking first in value added and manufacturing employment among upstate counties in 1972. The city of Rochester is the leading producer of photographic equipment and suppliers, accounts for over one-half of the value added by manufacture in the nine county area. It has and still provides most of the manufacturing and employment opportunities for Monroe and Livingston County.

c. By and large, the most significant development in the immediate Conesus Lake vicinity has been recreationally and residentially related. This may generally be attributed to the lake and vicinity aesthetic and recreational opportunities. A century ago, there were about 36 houses by the lake and a similar number in Lakeville. Lakeville was still agricultural in character with the interest in travel service, but not in residential vacationing to a major extent. As time progressed, and transportation modes improved, the large land holdings gradually dispersed and the lake area became popular as a recreation, resort, and increasingly residential area. In the late 19th and early 20th century, train and/or car excursions from the Buffalo and Rochester areas were common and at least 10 excursion steamers ran the lake from 1888 to 1900. Campgrounds, amusement parks, cottages, inns, and related developments increased. The automobile era was largely responsible for surrounding the lake with private lots and residences. Building occurred chiefly between 1920 and 1950, when over 1,100 houses could be counted. Twenty-five years later the number exceeded 1,800. Today the lake perimeter is approximately 75 percent developed (primarily residential) with over 2,000 homes, cottages, and trailers.

d. The village of Livonia possesses several of the attributes of a small agricultural trade center. Lakeville, at the lake outlet, had a milk processing plant at one time, but has become much more of residential, vacation, and day recreation service center, as well as a travel stop. Instability in enterprises, such as steam boat excursions and boat liveries is evident from neglect, abandonment, and new building. However, two industries are still located there, a foundary and a recently established syrup preparation plant. A group of older residences have persisted, and the growth of cottages and

three mobile home parks have merged into the hamlet. Virtually the entire lake perimeter has been developed as seasonal, recreational, or residential with scattered commercial developments (generally in the various hamlet modes) pertaining to recreational, food stuffs, or service oriented matters. Dwellings range from old mobile homes and cottages to the contemporary residential structure, and during the last two decades there has been a major shift to year-round residence, with recreation as a secondary consideration. (Forest et. al. 1978) Geneseo, just west of the watershed, is a noted exception to the generally agricultural, recreational-residential community characteristics. Although it does project these characteristics to some degree, it projects more of a college and administrative character, primarily because it is the Livingston County Governmental Seat and is the site of Geneseo State College.

3.32 Cultural Resources

a. Nineteen prehistoric and/or contact sites have been identified in the project area, but there are no historic sites (structural or archaeological) of significant integrity (COE). Based on two prehistoric site predictive models, and current information about known prehistoric and historic sites, a reconnaissance level subsurface testing study was completed in early June 1981. In the course of the survey, the project area was submitted to pedestrian survey, as well as the exca ation of 248 shovel test units and two one-by-one meter excavation units. Archaeological materials were recovered from the east side of the lake in the form of eight small surface sites and from the west bank of Conesus Creek. None of this material, however, was in the project area. None of the sites would appear to qualify for the National Register of Historic Places, but the sites on the east side of the lake might qualify for inclusion in some sort of archaeological district. The referenced report is on file at the U.S. Army Engineer District, Buffalo Office.

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STAGE III DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STAT--ETC(U)
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SECTION 4

ENVIRONMENTAL EFFECTS OR CONSEQUENCES

EFFECTS TO THE NATURAL ENVIRONMENT

4.01 Water Quality

a. Without Condition (No Action Alternative Plan) - An interceptor sewer system and a tertiary sewage treatment plant operation, located approximately 4 kilometers north of the lake, should almost eliminate direct input of effluents into the lake and creek. Anticipated results would probably include reduced amounts of phosphorus - a contributing factor in nuisance algae blooms - and improved oxygen content in the creek due to removal of high concentrations of organics. These factors should improve water quality conditions, allowing for improved use of these waters by fish, wildlife, and recreationists. However, if in the future, development within the basin should increase significantly, water quality could become degraded from non-point sources due to increased surface runoff.

b. Lake Level Regulation Plan

(1) The Management Plan would reduce historical peak lake levels. This could affect vegetation zones that are established along the perimeter of the lake and cause some die-off of vegetation. The result could be increased concentration of decomposing plant material. This would cause a temporary degradation of water quality until new vegetation zones become established.

(2) The Management Plan, on Conesus Creek and downstream areas, would provide a minimum creek flow of 10 cfs (monthly average). This would be a relatively constant flow which should be adequate for waste assimilation purposes and, to allow for continuous movement of water in the creek and through the wetlands downstream even during most dry periods. There are no gauges along Conesus Creek; therefore, historic records are not available to determine past outflows. However, operating plans of the existing control structure and plans call for minimum outflow of 10 cfs. Therefore, there are no definite records to indicate if these outflows were indeed met. It is assumed with the new Management Plan - which implements sophisticated regulation of lake levels and outflows by use of computer models and calls for a minimum constant outflow (10 cfs) - that water quality in the future should eventually improve in the creek wetland at Route 256 Bridge and other downstream areas.

c. Structural 30-60A Alternative Plan - Increased turbidity, some introductions of oil and grease into the creek from construction vehicles, and some increased sedimentation in downstream creek areas could occur. These effects will be caused by dredging, sloping of banks, and the placement of fill. However, these impacts are not expected to cause significant impacts on water quality in the creek. Impacts should be temporary and minor; water quality should return to preconstruction conditions soon after construction is completed and associated turbidity ceases.

d. Structural 30-60 Alternative Plan - Temporary impacts on water quality will be similar to the 30-60A Alternative Plan described in paragraph 4.01c.

4.02 Air Quality

a. Without Condition (No Action Alternative Plan) - Interstate 390 (Genesee Expressway) is presently under construction, with completion anticipated in 1982. Once completed, this interstate will provide quick and direct route between the New York State Thruway and the Southern Tier Expressway, Route 17. The Genesee Expressway will run parallel to Conesus Lake, approximately 5 kilometers to the west. It is anticipated that air quality will be lowered temporarily due to increased emissions from construction vehicles and other related construction activity (i.e., dust). Upon completion of the expressway, traffic flows in the Conesus Lake area are likely to be increased. Increased vehicular activity will bring long-term minor detrimental effects to air quality as a result of more vehicle emissions. The expressway also presents the potential for both increased residential and commercial development over time, which could bring with it further deterioration to the quality of air present in the Conesus Lake area.

b. Lake Level Regulation Plan - No significant impact on air quality is anticipated through the implementation of the Lake Level Management Plan.

c. Structural 30-60A Alternative Plan - There will be some temporary increased emission from construction vehicles and related construction dusts during construction periods which would temporarily increase air pollution. This impact is anticipated to be minor and would occur only during project construction and maintenance periods.

d. Structural 30-60 Alternative Plan - There will be some temporary increased emissions from construction vehicles and related construction dusts during construction periods, which would temporarily increase air pollution. The degree of this temporary impact, on air quality, is anticipated to be somewhat greater than with other feasible alternatives due to the following additional construction measures considered in this plan: (1) building a new access road for the trailer park; (2) excavation of a new creek channel; and (3) clearing and snagging of the existing channel; (4) mitigation in wetland-scalping, grading, and berm construction. Overall impact on air quality in the project locale is expected to be minor and would occur during project implementation and maintenance periods.

4.03 Endangered Species

a. There are no reported Federal endangered and/or threatened species within the project area. The marsh area south of Slicker Hill Road is now under the jurisdiction of NYSDEC. Future management of this area would probably result in improved and/or conserved habitat for fish, wildlife, and vegetation, which could include incidental use by such species during transient movement through the area. However, this marsh is outside of the project area and, therefore, no significant impact is anticipated as a result of implementation of any of the Stage 3 alternative plans. One NY State protected plant species - Cardinal Flower (*Lobelia cardinalis*) - was found in two locations on the Ames wetland parcel. See Plate 1 in the Section 404 Evaluation, Appendix E.

4.04 Wetlands

a. Without Condition - (No Action Alternative Plan) - There are few shoreline marshes along Conesus Lake due to previous extensive development. If development continues to increase, the continued existence of these few lakeshore marsh areas may be in question. The two primary wetlands located within the project locale are upstream of the Route 256 Bridge and at the south end of the lake where Conesus Inlet meets the lake. The private wetland upstream of Route 256 has been impounded by the placement of steel caps over the culverts that run under the Route 256 Bridge. This structure has artificially created and continues to maintain this wetland. NYSDEC has expressed concern regarding the need for continued existence of this area, especially with anticipated improvement in water quality resulting from tertiary treatment of sewage effluent that enters this marsh. Improved water quality should eventually lead to improved aquatic habitat within the marsh area, thereby potentially increasing its value to fish and wildlife. However, continued existence of this wetland may be questionable, because it is dependent on the placement of steel caps to block the culverts at the Route 256 Bridge. Eventually the wetland at the south end of the lake is anticipated to be managed by NYSDEC, but to date, recent coordination with NYSDEC indicated that no specific management plan has been developed.

b. Lake Level Regulation Plan

(1) Lower lake levels due to the COE Management Plans will cause impacts to the wetlands located along the perimeter of the Conesus Lake. The specific effects cannot be predicted for all wetland areas, since detailed topographic maps are not available. However, predicted general impacts based on existing literature and research are as follows: A decrease in high lake stages with a shift to a more stable range of water levels, could cause a shift of vegetation zones within the wetland lakeward, leaving a dry or drier wetland strip between the shoreline and the newly established lakeward zone. Since the current management tries to maintain relatively constant seasonal conditions, wetlands should reestablish themselves with only minor impacts. However, there would be a decrease in the open water areas within some wetlands. (Reference Appendix E, Section 404 on Mitigation, paragraph on wetlands.)

(2) The wetland area south of Slicker Hill Road is not influenced by Conesus Lake. Therefore, the Lake Level Management Plan should have no significant effect on this wetland area.

(3) The wetland, located upstream of the Route 256 Bridge, should experience positive gains due to the new Lake Level Management Plan. This new plan does not alter the culverts at the Route 256 Bridge (reference Hydrologic and Hydraulic, Appendix A), thus allowing for the continued damming of water which is necessary for the existence of this wetland. The Lake Level Management Plan guarantees a more consistent regulated flow into the creek and wetland. This should help improve water quality by creating an improved flushing action in the wetland - higher oxygen levels and, provide a more stable water level within the wetland due to the consistency of inflow, thus reducing the likelihood of critically low water and oxygen levels from occurring in the wetland during low flow periods.

c. Structural 30-60A Alternative Plan; 30-60 Altenative Plan - The anticipated impacts caused by either of these alternative plans is expected to be similar, since there are no wetlands in the immediate construction zone. However, approximately 5,000 feet downstream of the Route 20A Bridge is a wetland. This wetland will be subject to some increased sedimentation and temporary turbidity caused by upstream construction activity during project installation and maintenance. This impact will be reduced by installation of devices such as siltation screens and filter cloths, which will be employed during construction periods. The selected Contractor would be required to follow the Corps Civil Works Construction Guide Specification for Environmental Protection (CW-01430, dated July 1978).

4.05 Benthos

a. Without Condition (No Action Alternative Plan) - Benthic species are influenced by the existing water quality. Pollution alters and/or destroys various invertebrate bottom-dwelling species in an aquatic area, leaving only a few pollution tolerant species to survive. Certain areas of Conesus Creek have limited benthic populations, or in some areas, no benthic life at all. The Without Conditions Section on Water Quality predicts a probable shift to improved water quality over time in outlet. With this assumption, it can be reasoned that the future benthic faunal life of the outlet creek should eventually improve to be that of one associated with higher water quality.

b. Lake Level Regulation Plan - With lower lake levels, the new Management Plan could decrease the benthic habitat along the shallower lakeshore, which could destroy, disrupt and displace some aquatic bottom-dwelling invertebrates. This impact is anticipated to be minor, since fluctuations are not anticipated to be drastic or outside the historical ranges. However, the benthos of the outlet creek or Route 256 wetland could be beneficially impacted due to the new regulated flows. If water quality improves due to better flushing action, it could contribute toward eventual establishment of a more diversified benthic population. The new regulation plan should not cause any significant adverse impacts to the benthos. (Reference Appendix E, Section 404 on Mitigation.)

c. Structural 30-60A Alternative Plan - Construction, within Conesus Creek will unavoidably destroy, disrupt, and/or displace some of the existing benthos. The placement of the proposed control structure and drop structure, combined with channel widening, bank shaping, and placing of riprap, bedding stone and sheet piling will either cover or remove the existing benthic poplations in the immediate project zone. The affected area will include a zone, from the junction of Conesus Creek with Conesus Lake, to a point approximately 200 feet downstream of the STP. In addition, some sediments will inevitably be resuspended during construction and will probably settle out downstream within the slack areas of the wetland upstream of Route 256 Bridge, possibly covering and disrupting some benthic organisms. This should not impact on the existing benthos significantly, since biological investigations have shown that the benthos here is highly degraded (White and Alldridge, 1980). The remaining benthic population in Conesus Creek is described as one, consisting mainly of "lake species" -benthic organisms typically found in lakes of the region. These species will be adversely impacted, but the impact should be of temporary duration, since the area will likely reestablish with benthic

invertebrates from the lake soon after construction is completed. In addition, areas below water where riprap and bedding stone are added, will provide a new and more stable habitat for the eventual reinvasion and reestablishment of benthic organisms. The introduction of this stone may provide increased surface area for utilization by benthic invertebrates.

d. Structural 30-60 Alternative Plan - Construction of this alternative will have the same general types and degree of impacts as were described in paragraph 4.05c for the 30-60A Alternative Plan. In addition, a new channel will be excavated from the lake through the trailer park to a point approximately 600 feet downstream from the mouth of Conesus Creek. This alternative will increase the overall area of benthic habitat by approximately 8,000 square feet in the project zone by leaving the existing channel habitat intact and adding new habitat with the construction of the proposed new channel.

4.06 Vegetation

a. Without Condition (No Action Alternative Plan) - The existing natural lakeshore vegetation is not expected to change significantly except in areas of increased development. In these areas, existing vegetation will probably be replaced by introduced terrestrial landscape plantings. Most marshland within the project area is under the jurisdiction of NYSDEC; currently, management plans are not specific or definite for such fish and wildlife habitat. Future vegetation in these areas will depend on future NYSDEC management plans for Conesus Lake and its peripheral shoreline lands.

b. Lake Level Regulation Plan - The new Lake Level Management Plan may cause some peripheral shoreline die-off of emergents and submergent aquatic plants due to lower lake levels, but this impact should be minimal with reestablishment of species occurring when water level ranges stabilize under the new Management Plan. If lower lake levels occur during the growing season, there could be some lakeward shift of aquatic vegetation, leaving a somewhat drier area along the landward edge of the wetland. This condition could shift the existing vegetation to more terrestrial species (i.e., sedges and shrubs). However, under the lake level regulation plan, low water levels would be anticipated to occur during the nongrowing season (winter months). Therefore, no significant shift toward more terrestrial vegetation is expected. However, some winter kill of aquatic vegetation on exposed mud flats may occur. The primary function of the Lake Level Management Plan is to reduce flooding of private property around the lake periphery. This may cause some areas that are infrequently flooded - due to peak lake levels - to have minor shifts in vegetation toward more terrestrial species with the dying off of some mesophytic species. Therefore, this plan is not expected to cause any significant impact to the vegetation in the Wildlife Management Area, the wetlands upstream of the Route 256 Bridge, Conesus Outlet, or the lake itself. (Reference Appendix E, Section 404 on Mitigation.)

c. Structural 30-60A Alternative Plan

(1) Construction will destroy almost all riparian bank vegetation as well as aquatic plant species in Conesus Creek, from its junction with Conesus

Lake, downstream to the proposed drop structure located approximately 25 feet downstream of the Route 20A Bridge. Downstream from this point, to the end of the construction zone, approximately 200 feet downstream of the STP, construction will be confined mainly to the west bank of the creek. This will eliminate existing vegetation along this bank.

(2) Disturbed banks will be revegetated and mulched to help minimize soil erosion. In order to maintain channel design capacity, the newly constructed channel banks will be reseeded to grasses and legumes. Tree and shrub plantings, as needed, would be located outside the limits of the basic project structure. Planting determinations would be incorporated into the final design of the project. No disruption is anticipated to occur to the east bank, thereby leaving riparian vegetation intact. Emergent, floating, and submergent aquatic plant species will also be adversely effected by construction, but field investigation indicated aquatic vegetation in the creek, is sparse. Eventually, some natural aquatic plant reestablishment will probably take place following construction; and over time most disturbed bank areas, including soil filled crevice areas among stone riprap, will probably be invaded with some species of native weed plants, thereby providing some additional vegetative cover and increased bank stabilization, as well.

d. Structural 30-60 Alternative Plan - Construction will destroy almost all terrestrial vegetation, riparian bank vegetation, as well as aquatic plant species in and along Conesus Creek, from the lake through the trailer park to a point where the new channel will meet the existing creek. From the junction of the new channel and existing creek to the proposed control structure located approximately 25 feet downstream of the Route 20A Bridge, almost all riparian bank vegetation and aquatic plant species will also be destroyed. In addition, a new access road will be constructed off of West Lake Road. The existing dirt road will be slightly modified and extended. This process will unavoidably destroy or cover some existing terrestrial vegetation. Downstream of the proposed drop structure, the impacts to the vegetation are anticipated to be the same as in paragraph 4.06c. In addition, some vegetation along the existing creek will be cleared and snagged, but the majority of the species will remain undisturbed.

4.07 Fishery

a. Without Condition (No Action Alternative Plan) - As stated in paragraph 4.01 on future water quality, conditions are expected to improve, especially in sections of the outlet creek and wetland area upstream of the Route 256 Bridge. This improved condition will probably allow for increased species diversity within these areas. Concerning the lake, inlet, and associated marsh areas, better water quality could beneficially contribute toward improving these habitats for fish spawning, feeding, or as nursery habitat. Such improved water quality, coupled with any further development in fishery management that may occur, will probably influence the course of future fisheries in Conesus Lake.

b. Lake Level Regulation Plan

(1) Most regulation plans have the potential to adversely affect some stage in the life cycle of fish. This disruption could be significant -

depending on the species and life stage - or could be relatively significant (IJC, 1980). The primary fishery of Conesus Lake as mentioned in the Existing Conditions Section, paragraph 3.13 is comprised of Walleye, Centrarchids, and Northern Pike. These are the species considered in assessing probable impacts.

(a) Walleye - The new Management Plan draws the lake level down in the fall (October). This could benefit the walleye in two ways. First, drawdown may allow the gravelly areas of the lake to be cleansed by wave action and runoff, thus cleaning preferred spawning habitat material used by walleye. Secondly, drawdown might cause winter kill of some aquatic vegetation which could create additional habitat for walleye spawning. In addition, this reduction of vegetation could diminish habitat usage by yellow perch, therefore, giving juvenile walleye a better chance of survival. These beneficial impacts still depend on lake levels being brought back up in the spring, as provided for in the Lake Level Management Plan (White and Alldridge, 1980). The <u>Biological Studies of Conesus Lake and Tributaries</u>, by White and Alldridge, 1980, recommends that South McMillan Creek be cleared of obstructions - dead fall trees - because this has effectively blocked any migration of walleye into the tributary. This creek is out of the project area and no significant impact is anticipated by this alternative, but the recommendation should be considered for implementation by the local cooperator.

(b) Centrarchids - The biological study that was performed at Conesus Lake (White and Alldridge, 1980) indicated that centrarchids generally utilize depths of between 1.5 and 12 feet for nesting. Nests were constructed in various substrates; sand, gravel, clear vegetation; and on gently sloping areas. Therefore, since general lake contours of the lake bottom indicate that most of the bottom topography is gently sloping and that centrarchids utilize various substrates, projected impacts are anticipated to be one of centrarchids shifting their spawning grounds to other available habitat substrates; therefore, no significant impacts are espected to this family of fish species.

(c) <u>Northern Pike</u>

(i) Two primary areas are utilized by Northern Pike for spawning within the Conesus Lake area. The first is the Wildlife Management Area south of Slicker Hill Road outside the project limits, used by pike for spawning and more than likely as a feeding and a nursery area as well. Water levels in this marsh operate independently of Conesus Lake Levels (White and Alldridge, 1978-79) and sufficient water is retained in the marsh for the entire summer, so that any hatching pike have a suitable exisitng environment for development. Pike have access to this wetland via Conesus Inlet. Therefore, as long as pike have access to this wildlife area, pike spawning should continue. The new Lake Level Management Plan should not significantly alter levels within the inlet and, no construction is scheduled in this wetland, so impacts to pike in this area are not anticipated to be significant.

(ii) The second area used by pike for spawning is the marsh located at the southern end of the lake at the mouth of Conesus Inlet. This marsh was studied to investigate use by pike for spawning and to document depth

preferences, vegetation preferences, and temperatures within spawning areas (White and Alldridge, 1978-79). Results of these studies indicated that this area is used by pike for spawning and that, water depths of 6-18 inches are required for maximum effectiveness. In addition, most any vegetation submerged to the proper depth will be utilized by the pike, as long as the vegetation is found in conjunction with some open water (White and Alldridge, 1978-79) and temperatures fall within the ranges of 6°-10°C. Although spawning occurred in this area, the principal biological investigator, Dr. Andrew White, felt that overall production was minimal due to the topography of this marsh. The terrain is such that the area is composed of numerus depressions, which trap newly hatched pike when the higher lake levels recede, thereby preventing juvenile pike from reaching open water. It is probable that the greatest success for spawning in here, is experienced on the fringe areas which provide easy access to the open waters of the inlet and lake.

(2) The new lake level management scheme tries to bring lake elevation to 819.0 during the month of February, but on the average it only brings the elevation to 818.75. The 819.0 is not reached on the average until early May. (reference Appendix A). These proposed lake levels will exclude the dry meadow areas, located in the southern inlet marsh from being utilized by pike for spawning. Spawning did occur in the fringe areas of the marsh and inlet indicating suitable habitat is available. The Lake Level Management Plan, with lower lake levels, would probably concentrate the pike in these fringe areas. In addition, a conclusion drawn by the principal investigator for the biological studies performed at Conesus Lake was that, the most significant pike spawning and production for Conesus Lake occurs in the Wildlife Management Area south of Slicker Hill Road, which will not be adversely affected by the Lake Level Management Plan. However, at the recommendation of NYSDEC and USFWS, 10 acres of this wetland will be scalped, graded, and revegetated under the direction of the Corps, in accordance with a jointly coordinated mitigation measure. This mitigation action should compensate for lost northern pike spawning habitat caused by lower lake level elevations which are being proposed for the purpose of reducing flood damages. Reference Appendix E for details on the mitigation plan and anticipated impacts.

c. Structural 30-60A Alternative Plan

(1) The existing condition in Conesus Creek, at the Route 256 Bridge, is such that any upstream migration of fish is presently obstructed by the presence of three culverts that exist under this bridge. The only influx of fish into the creek comes from Conesus Lake, and this passage is partially blocked by the existing control structure. Therefore, the creek is somewhat of a closed system. Fishery investigations of the creek (White and Alldridge, 1978-1979) showed that this creek is responsible for the production of typical stream species (i.e., shiners, minnows, dace, suckers, darters and sunfish) and that, the only area that seems to be utilized by sport or game species as a nursery or spawning area, is the area at the junction of the lake and creek.

(2) Projected impacts on the existing fish population of the creek are anticipated to be significant, but should only last for the duration of the construction period. The creek does not support or add significantly to the

fish population of Conesus Lake (White and Alldridge, 1980) and is composed of mainly common species which are also present in lake. Therefore, the overall impact to the fishery of the project area is anticipated to be minor. Once construction is completed, fish from Conesus lake and the wetland upstream of Route 256 would likely move back into the creek. Presently, there may be movement of fish from the creek into the lake. This movement is restricted by the existing control structure. The installation of the new control structure will probably still restrict access.

d. Structural 30-60 Alternative Plan

(1) Construction of this alternative is expected to cause fishery impacts that are very similar to the effects caused by the 30-60A Alternative, as described in paragraphs 4.07c. In addition, the new channel will increase the fish habitat in the outlet area of the lake. This additional habitat could improve the overall fishery of the area because, as stated in the Biological Investigation of Conesus Lake (White and Alldridge, 1980), the outlet of Conesus Lake is utilized as a spawning area and as a limited nursery area for various species of fish. This increase in channel area could provide additional habitat for species utilization.

(2) The installation of control structures in both the 30-60 and the 30-60A Alternatives will curtail or prevent fish movement from the creek back into the lake. This condition could occur in both alternative plans, but it is not anticipated to be a significant impact since downstream spawning runs are rare.

4.08 Wildlife

a. Without Condition (No Action Alternative Plan) - A significant amount of fish and wildlife habitat has been lost to development along the Conesus lakeshore. Loss of this habitat has reduced the value of this area to mammals, waterfowl, amphibians, and reptiles. Continued development would reduce the lakeshore habitat further. Although there are two significant marshes located within the project area, these marshes are probably not inhabitated or utilized by a significant number of wildlife species. According to a recent biological survey (White and Aldridge 1978-1979), the future of these areas, their habitats, and ultimately the wildlife that inhabitats and utilizes them, will be influenced and affected by proposed management's plans formulated by NYSDEC and future local development.

b. Lake Level Regulation Plan

(1) Information from the 1980 Biological Study indicated that the maximum concentration of wildlife species (i.e., ducks, muskrats, raccoons, etc.) were located in the Wildlife Management Area south of Slicker Hill Road. It is here that maximum production of waterfowl and muskrats occurred. Since this area will not be affected by the Management Plan, production is expected to continue with no anticipated impact on wildlife productivity. (Reference Appendix E, Section 404 on Mitigation.)

(2) Conesus Lake did show some waterfowl production, but this occurred on the residential lawns and under docks. The Regulation Plan is not expected to significantly affect waterfowl nesting. In addition, since shoreline marshes are not abundant along the lakeshore periphery and are regularly disturbed by human activity, suitable habitat is very limited for muskrats and other furbearers, so the Regulation Plan is not anticipated to cause significant impacts. The Regulation Plan will provide for a more consistent and dependable flow in Conesus Creek and into the wetland area upstream of the Route 256 Bridge. This new condition could increase levels of water in the wetland area during the summer months, improving habitat for furbearers. In addition, habitat unavailable to waterfowl due to lack of standing water would be improved for nesting, rearing of young, and as feeding habitat because more uniform flows provided by the Lake Level Regulation Plan would help to maintain the water levels in wetland portions formerly susceptible to drying. This improved condition habitat should have a positive impact on wildlife species in both these areas.

c. Structural 30-60A Alternative Plan; 30-60 Alternative Plan - Anticipated impacts from either of these alternatives are expected to be similar. Construction will impact on terrestrial habitats and associated wildlife species. Small mammals and some birds, including waterfowl, will probably be temporarily displaced from the project area during actual construction. This impact is anticipated to be minor and some species will probably return to utilize the project zone after construction is completed. Planting determinations will be incorporated into the final design of the project to help mitigate loss of any existing riparian wildlife habitat.

EFFECTS TO THE HUMAN ENVIRONMENT

4.09 Flooding, and Man-Made Resources

a. Without Condition (No Action Alternative Plan)

(1) It is anticipated that floods similar to those of the past would continue in the Conesus Lake Basin. It is expected that flood damages would increase with new developments and as the value of contents and structures increased with the conversion from cottage to permanent housing.

(2) Flood damage reduction measures would probably continue to be individual or community emergency efforts. The existing outlet and control structure would have limited and generally insignificant capacities in flood control. These would probably continue to be operated under the parameters of the permit issued by the NYSDEC.

b. Lake Level Regulation Plan - The intent of the Lake Level Regulation Plan is to significantly reduce flood damages while considering desired lake levels for recreation, fish and wildlife, water supply, and downstream water demands. (See Economic Appendix B.)

c. Structural 30-60A or 30-60 Alternative Plan and Downstream to Route 256 - Both the 30-60A and the 30-60 Plans would allow the same level of control relative to lake level regulation. The major difference between the two lie in cost, hydrologic efficiency, and impacts to both the natural and

human environment. Generally, implementation of these structural measures would disrupt the existing trailer park community at the mouth of the lake. Their implementation would require some easements and acquisition of properties and would alter some existing lake access. These impacts would occur primarily between the lake and the Route 20A Bridge.

4.10 Noise

a. Without Conditions (No Action Alternative Plan) - Noise levels in the Conesus Lake vicinity will likely increase somewhat in the future. The completion of the Geneseo Expressway will increase traffic volume in the lake vicinity - particularly in Lakeville. With an expected increase in development and lake recreational activity, a corresponding increase in noise levels would be anticipated. Given the existing level of development and lake utilization, however, human activities and corresponding noise levels may begin to stabilize as people cannot or choose not to participate in lake activities because of crowded conditions.

b. Lake Level Regulation Plan - It is not expected that the implementation of the proposed Lake Level Regulation Plan in itself would result in a significant increase in noise levels over that anticipated for the "No Action" Alternative.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Construction equipment and activities would generate noise during construction and maintenance periods. Conventional earth-moving equipment, primarily heavy trucks and equipment used in channel modification and control structure construction, would all generate above normal noise levels. Noise from these sources would be audible at homes and businesses in the immediate project area and could have some temporary increased impact on residents and normal community activities. Impacts would be temporary and localized. No significant long-term measure in noise levels is anticipated.

4.11 Aesthetics

a. Without Conditions (No Action Alternative Plan)

(1) The aesthetic quality or value of any setting depends upon the subjective perceptions and value system of the perceiver.

(2) The Conesus Lake perimeter and vicinity is already heavily developed residentially and has been identified by Livingston County as an urbanizing area. The aesthetic qualities and recreational opportunities of the lake setting induce continued and even-tiered development. These developments will continue to alter the natural environment. Therefore, local zoning and building codes will continue to be among the important factors in determining future impacts on lake-associated aesthetic features.

(3) Water quality has been, and continues to be, an important aesthetic issue. Conesus Lake has a high water quality level and it is expected to improve, primarily as a result of the lake perimeter public sewer line.

b. Lake Level Regulation Plan - More desirable lake levels and reduction in debris and disorder resulting from a flood event would contribute to

and preserve aesthetic qualities of the lake vicinity. However, the resulting induced developments could impact upon aesthetic qualities through structural improvements and modifications and/or through increased intensified developments. These developments could be conceived as either beneficial or adverse. (Reference Appendix E, Section 404 on Mitigation.)

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - During the construction period, unavoidable temporary disruption in the appearance of the construction area would occur due to construction equipment activity such as noise, dust, odor, and water turbidity. These impacts will remain for the duration of the construction period and during some future maintenance operations. Either of the alternatives would require channelization modification as well as construction of control structure facilities. New man-made structures would be introduced to the setting and some existing structures would be repositioned. Generally, channels would be widened and straightened, and some existing streambank vegetation would be destroyed for several thousand yards in the channel modification zone. Feasible conservation planting measures, however, would be incorporated into the plan specifications to help mitigate affected natural aesthetic site qualities in the environmental setting. With consideration in project modifications for positioning of man-made structures, revegetation, and plantings; aesthetic qualities in the project area would be restored (or improved to some degree) in accordance with Engineering Manual 1110-2-28, Environmental Quality in Design of Civil Works Projects - Specifications.

4.12 Population

a. Without Conditions (No Action Alternative Plan) - The Conesus Lake perimeter and several of the communities in the lake vicinity - primarily Lakeville, Geneseo, and Livonia - have been identified as urbanizing areas by Livingston County. Correspondingly, population, density, and mobility is expected to increase in the vicinity. (Reference Section 3.18, Population.)

b. Lake Level Regulation Plan - The potential flood damage reduction and other benefits resulting from improved lake level regulation may contribute to induced area development and in turn, increased population density in, and mobility into, the area. However, because the lake perimeter is already intensely developed and, in light of existing regional developmental pressures, this contribution would probably be a minor impact.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Land and easement acquisition may limit development in the immediate project area. Construction of either of the structural alternatives, however, is not expected to have major significant impacts on overall population density or mobility in the area.

4.13 Displacement of People, Land Acquisition, and Access

a. Without Conditions (No Action Alternative Plan)

(1) Indirect displacement of people could result from continued severe flooding and damage along the lake perimeter. Some people may decide to move

out of the most severe damage areas. This movement would be voluntary and no land acquisition or easement requirements would be expected.

(2) Lake access and related conflicts over public and private needs have been identified as problems at Conesus Lake. State, county, and local agencies may work to address this issue. The "No Action" Alternative, however, would not be anticipated to significantly affect existing lake access conditions.

b. Lake Level Regulation Plan - No displacement of people or land acquisition would be anticipated as a result of the proposed Lake Level Regulation Plan. The necessary structural control alternatives would, however, require both relocation of people and acquisition. Lake access might be improved through lake level regulation, primarily as a result of more frequent, consistent, and longer periods at desirable recreational lake levels.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256

(1) Both structural plans would result in some acquisition, acquisition of easements rights, and relocation of some community facilities and developments. Some existing stream and/or lake access would also be altered. Table 6 summarizes relocation, land acquisition/easement, and access effects of the various alternative measures.

Table 6 - Displacement, Acquisition, and Access

Alternative Plans	Relocations (Trailers) (No.)	Easements and/or Land Acquisition (Estimated)	(Acres)	Creek and Lake Access
No Action	0		0	Creek-to-lake access is limited by low bridge.
Lake Level Regulation Plan	0		0	Improved lake levels and access through regulation.
30-60A Measure (Between the 20A Bridge & the lake)	5 to 13 trailers (including unilties) 2 cottages	Construction and Easement	2.3	Creek to lake access would be limited by new control structure. Possibly some creek and lake access lost due to relocation.
30-60 Measure (Between the 20A Bridge & the lake)	6 trailers (including util.)	Construction and Easement	1.9	Creek-to-lake access would be improved with construction of the new channel. Some immediate lake access would be altered.
From the 20A Bridge to the end of construction	0	Construction and Easement	8.0	Not Applicable

(2) The 30-60A Plan alinement would follow the existing channel. Improved channel dimensions and necessary easements would require acquisition of approximately 2.3 acres of land along the Conesus Creek Outlet in the reach from the lake to the Route 20A Bridge. This alternative would also necessitate the relocation (or repositioning) of an estimated 5 to 13 trailers and associated facilities, and two cottages. Those affected would be the trailers and cottages situated along the existing outlet. Adequate room to pull the trailers further into the park is questionable. Significant modification to facilities near the private road bridge would also be necessary (utilities, the bridge, sheet piling). Small-boat access to the lake by way of the Conesus Creek Outlet would be improved because of deeper water upstream of the new control structure.

(3) The 30-60 Plan would incorporate construction of a new channel from the lake through the trailer park. This new channel combined with the existing channel allows for utilization of both the exisitng and new channel capacities, which significantly reduces land acquisition and relocation requirements. Improved channel dimensions and easement requirements would necessitate acquisition of approximately 1.9 acres of land in the reach between the lake and the Route 20A Bridge. Construction of the new channel cut through the trailer park would physically severe the trailer community, as well as require the relocation (repositioning) of an estimated seven trailers, including three with immediate lakefront access. Although designation of new sites would primarily be the responsibility of the land owner, there appears to be adequate room in the trailer park for relocation of trailers. A footbridge would be constructed to maintain pedestrian access over the new channel, and an access road provided from the west to maintain vehicular access. Since the control structure would be located downstreamn of the Route 20A Bridge, Conesus Creek and the new channel would be subject to lake level stages from the lake up to the control structure. Small-boat access to the lake by way of the creek and new channel would be improved. (The footbridge would be constructed high enough to provide boat access.)

(4) The downstream modification to the Conesus Creek outlet would be relatively minor. The existing channel (already with about a 25-foot channel bottom width) would be modified to a 35-foot bottom width trapezoidal channel with 1 vertical to 3 horizontal sideslopes; from the Route 20A bridge to a location (just below the sewage treatment plant) about 5,000 feet downstream to the Route 20A bridge. The improved channel would follow the existing channel alignment as much as practical. Most of the channelization and excavation work would occur along the west bank. This would preserve the existing riparian vegetation along the east bank and minimize adverse impacts to the residential properties that exist between the creek and Rochester Road;

Approximately 44,000 cubic yards of material would be excavated. This material has been tested in 1981 and determined to be nonpolluted when compared to the "National Primary Drinking Water Standards." Any depositing of soil from the bank modifications and dredgings on lands would be done in such a manner as to retain natural or existing man-made drainage characteristics, and in a manner as agreed upon/indicated by the respective landowners/

operators. This would be determined in negotiations for land and easements and would be developed in more detail in finalization of plans and specifications.

Acquisition and/or easement rights of about 8 acres of land would be required along the west bank in this reach. About 3 acres of this land consists of present instream acreage. This would provide an approximate 35-foot wide strip of land along the entire bank to provide room for construction and maintenance access. Land acquisition and relocation would occur pursuant to the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970," Public Law 91-646, which provides for the fair market value of property, and other compensations.

Although agricultural lands is an important issue in the region and vicinity (reference Appendix E), the necessary modification to the stream in the vicinity is not extensive and no significant adverse impacts to agricultural activities, lands, or displacement of farms is anticipated.

4.14 Employment/Labor/Income

a. Without Condition (No Action Alternative Plan) - Developments in the Conesus Lake Basin and the immediate lake vicinity could be expected to become increasingly residential/recreational in nature, primarily because of the vicinity's lake-related characteristics. Increased employment and income related to these types of development would be expected.

b. Lake Level Regulation Plan - Improved lake level regulation might contribute to increased developments in the area and inturn, contribute to business and employment opportunities. This might particularly be true in respect to marina, sporting goods, resort, foodstuff, and housing activities.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Construction, maintenance, and operation of either of the structural alternatives would provide some opportunity for employment in the local vicinity. This impact, however, would ger rally be short-term and not extensive.

4.15 Land Use

a. Without Condition (No Action Alternative Plan)

(1) The future land use in the Conesus Lake area is likely to remain much the same as at present, (i.e., lake residential). Based on current zoning, the kinds of changes which are probable include: (1) higher density development in some areas of the lakeshore, particularly those zoned for such densities, e.g., along the north shore of the lake in the town of Livonia; (2) a combination of multi-family structures and "executive" type single family homes in the upland areas; (3) commercial development in the villages of Geneseo and Livonia and in Lakeville (much of this will be associated with the Genesee Expressway); (4) upgrading and/or winterizing of present dwellings. (Appendix B)

(2) There will undoubtedly be strong pressures for higher intensity development at the lake. New construction and major remodeling on the lakeshore will also be governed by the requirements of the Federal flood insurance program, in which all four towns are involved. (Appendix B) Currently, zoning limits multi-unit housing to eight units for most lake property. This is a likely limit over the long term due to the constraints on available land. The limits on upland development will be governed by zoning and availability of utilities.

(3) Given present policy and attitudes of both the county and lake residents, it is unlikely that there will be commercial or industrial development on the lakeshore or upland area, with the exception of the hamlet of Lakeville. Its location at the intersection of two State highways (Routes 20A and 15), both of which are on interchanges for the Genesee Expressway, make it an obvious location for development.

(4) In 1967, in the Conesus Creek Outlet area immediately adjacent to the lake (Dand Point, trailer park, vicinity), proposed plans were to construct a motel, restaurant, and recreation area. "To date, progress toward this goal has consisted of clearing, filling, and installation of a steel breakwall to eliminate deteriorization of the shoreline." (Anderson, 1976, CLA)

b. Lake Level Regulation Plan - Implementation of the Lake Level Regulation Plan would not be expected to significantly alter the types of land use as that anticipated under "Without Conditions." Resulting flood damage reduction, however, would be expected to stimulate both improvements to existing structures and possibly, new development in previously designated hazardous areas.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Either of the alternatives would require some land acquisition and easements for the construction and maintenance of control facilities. Although several trailers would need to be repositioned and lake access issues would need to be addressed, it is not anticipated that significant land use changes would occur. See Appendix E also.

4.16 Property Value/Tax Revenue

a. Without Conditions (No Action Alternative Plan) - The Conesus Lake perimeter and vicinity is identified as an urbanizing area by Livingston County. Aesthetic and recreational characteristics of the lake area continue to add increased value to land in the immediate vicinity. Development in the lake vicinity is anticipated to be primarily residential and recreation related, although some commercial developments could be expected in the villages of Lakeville, Geneseo, and Livonia. In addition to these new developments, intensification and improvements to existing structures and developments is anticipated. This would increase property values in the vicinity, and if reassessed accordingly would increase tax revenues.

b. Lake Level Regulation Plan - Lake level regulation is expected to significantly reduce potential flood damages along the lake perimeter. This

would encourage property improvements and if reassessed accordingly, would result in both additional increased property values and tax revenues.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - These plans would alter access in the construction area. Depending on future developments, property values and tax revenues could be expected to be adjusted accordingly. Relocation of utilities is usually a local cost and would generally be paid for through local tax revenues.

4.17 Housing

a. Without Conditions (No Action Alternative Plan)

(1) Population growth in the region and the county will bring pressures for additional housing, and for replacement of older structures. The Conesus Lake vicintiy is expected to develop in this regard. Additional pressures for housing and other development associated with the Genesee Expressway are also expected. Future potential access to interchanges in proximity to Geneseo and Lakeville will make this locale (or area) attractive as a rural home location for many who would desire easy commuting to Rochester. (EC)

(2) There is limited opportunity for new construction on the lake. There will, however, continue to be improvements and modifications to the housing stock. Many of the dwellings are older, and are being upgraded in response to economic conditions. The lake has typically been a recreation area, but is becoming a year-round community. In the future, there will probably also be additional second and third tier building above the lakeshore development. One area of potential multifamily development is the Whispering Hills Mission, formerly a camp on the upland side of Route 256 above Sleggs Landing. The site is presently connected to the perimeter sewer and could support more dense development. (Appendix B)

b. Lake Level Regulation Plan - The flood control project cannot be expected to have a significant direct effect on the number of dwellings in the flood plain because of the limited developable land for building. It could, however, produce increased incentives for upgrading and improving property, which may generally improve the quality of housing stock in the immediate vicinity.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Either alternative would require the repositioning of seasonal trailer homes located in the trailer park at the lake outlet. Plan 30-60A would also require the acquisition or relocation of two small cottages so that adequate easements could be maintained. See the section on Relocation, Acquisition, and Access. The trailers could probably be repositioned in the same vicinity and no units would be lost. Relocation of the two cottages would be more difficult.

4.18 Business and Industry

a. Without Conditions (No Action Alternative Plan) - Developments in the Conesus Lake Basin and the immediate lake vicinity could be expected to

become increasingly residential/recreational in nature, primarily because of vicinity's lake-related characteristics. Demand and opportunities for relative business developments could be expected. Generally, marinas and recreational-oriented businesses are those most adversely affected by damaging lake levels. Relative to damages as those that have occurred in the past, and in reference to increased developmental pressures, increased damages could be anticipated if these plans or no alternative measures are implemented.

b. Lake Level Regulation Plan - Under the prescribed lake level regulation criteria, flood-related damages would be reduced, with corresponding reductions in cleanup and repair expenditures and facilities could be better utilized. Improved lake level conditions might also contribute to secondary businesses through increased demands for sporting goods, food stuffs, building materials for improvements, and related services.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256

(1) Lake and stream access is an important issue with implementation of these structural alternatives. Presently, the existing control structure (1964) is located just south of the Route 20A Bridge. This structure raises the creek level between the structure and the lake, and the creek is utilized for small-boat (12 foot) access to the lake. The owner of the bait and small-boat rental business (located on the west creek bank adjacent to the existing control structure) has expressed his concern about any alternative that affects his access to the lake.

(2) The 30-60A Plan would maintain the existing small-boat access by way of the Conesus Creek Outlet.

(3) The 30-60 Plan would maintain and improve creek-to-lake access opportunities. This could, in turn, stimulate improved and additional recreational business opportunities.

(4) The construction contract might be let to a local firm which would temporarily contribute to business activities in the vicinity.

4.19 Transportation

a. Without Conditions (No Action Alternative Plan) - The most significant transportation development with expected regional, county, and local impacts is the construction of the Geneseo Expressway scheduled for completion in late 1982. The completed project will connect the Rochester Metropolitan Area with the Southern Tier Expressway (Route 17).

b. Lake Level Regulation Plan - It is not anticipated that implementation of the lake level regulation plan would significantly affect transportation or facilities in the Conesus Lake vicinity, although existing recreational boating levels and facilities would be better maintained and/or benefited.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256

(1) During the construction of either of the control structure alternatives and channel modifications, normal traffic flow may be temporarily halted rerouted, or congested due to the loading, unloading, and movement of construction equipment. This would occur primarily in the vicinity of the Route 20A Bridge, along Rochester Road (Route 5), and the Millville Dam (Route 256 Bridge and dam). This would result in temporary inconveniences. No bridges or other major transportation facilities would need to be modified other than placement of riprap to protect foundations from erosive stream flow velocities.

(2) Construction of the 30-60 Plan would severe the vehicular traffic route through the trailer community. A pedestrian footbridge would be constructed over the new channel cut and an access road constructed to provide access from the west.

4.20 Utilities and Services

a. Without Conditions (No Action Alternative Plan)

(1) Water Supply - Table 7 shows the New York State Department of Environmental Conservation's estimate of the water supply requirement for the area.

Table 7 - Water Requirements

Community	Population 1990	Population 2020	DEMAND - MGD 1990 Average Daily	DEMAND - MGD 1990 Peak	DEMAND - MGD 2020 Average Daily	DEMAND - MGD 2020 Peak
Avon Complex	5,800	9,200	2.22	3.33	3.38	5.06
Lakeville	2,400	2,800	0.30	0.45	0.35	0.53
Conesus Lake Communities	10,200	16,000	1.02	1.53	1.60	2.40
Geneseo	13,500	22,000	1.81	2.72	3.46	5.19
York Complex	3,050	4,600	0.48	0.73	0.83	1.24
Total	34,950	54,600	5.83	8.76	9.62	14.42

(2) According to the Livingston County Planning Board, the present system in the village and hamlets of Avon and Geneseo will be adequate at least into the near future and no pressing need for supply or facilities is apparent. Livonia has a relatively new 500,000-gallon storage facility estimated to serve beyond 2000. (Livingston County Planning Board, Public Utilities and Services, 1971)

(3) Sewage Treatment - Lakeville and Livonia are part of the recently constructed Conesus Lake Sewer District (1973). The system was designed for significant future capacity and should provide adequate service for some time to come depending on future development in the area. The village of Avon's

recently constructed 1.7 mgd sewage treatment plant is designed for secondary treatment and should provide adequate service through 1990 as it is capable of expansion to 3.4 mgd. The village of Geneseo's plant capacity has been expanded to 1.5 mgd, which should be adequate to serve the area through 1990. (Livingston County Planning Board, Public Utilities and Services, 1972)

b. Lake Level Regulation Plan - Implementation of the Lake Level Regulation Plan would not significantly affect any utilities or related service. Consideration for the community water intakes (depths lower than 815 lake elevation) outflow sewage treatment assimilation and small hydraulic generation needs have been considered in the plan developed.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Neither the 30-60A nor the 30-60 outlet modification plans would require significant repositioning or modification of the pipeline going to the Lakeville sewage treatment plant. This pipeline crosses under or is near the Conesus Creek Outlet at least five times before reaching the plant. Measures would be incorporated to protect the sewerline from damage during construction in the immediate outlet vicinity. Utility areas requiring similar measures may be identified during construction.

4.21 Community Services/Health and Safety

a. Without Conditions (No Action Alternative Plan) - Should continued flooding problems persist along the Conesus Lake perimeter, related health and safety concerns and related needs for community services would also persist. In light of developmental trends, it is expected that demands for protective health and safety programs will continue to grow. These needs will continue to be investigated and addressed primarily through county and local agencies. In the Conesus Lake vicinity, the Conesus Lake Association is expected to continue as a key unification and driving force toward meeting those needs.

b. Lake Level Regulation Plan - The reduction of potential flood hazards resulting from lake level regulation would, in turn, reduce health and safety hazards associated with flooding conditions, (e.g., drownings, structural failures, electrocution, sewage and drainage backups, water contamination, etc.).

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - During construction of either of the structural alternatives, associated construction hazards would present themselves. This would include primarily site hazards and the presence and movement of construction equipment. These hazards would be relatively short in duration, however, and measures would be taken to reduce any dangers. It is not anticipated that implementation of the control structures or channelization features would present any significant increased health or safety hazards to the Conesus Creek Outlet vicinity. Safety features will be implemented whenever feasible.

4.22 Leisure Opportunities (Recreation)

a. Without Conditions (No Action Alternative Plan) - With anticipated developmental pressures in the Conesus Lake vicinity, increased demands for lake recreational utilization are expected. Lake access and overcrowding will become increasingly important issues for both summer and winter activities. Multilevel planning efforts must continue to address these problems.

b. Lake Level Regulation Plan - Reduction in flood-related damages and improvement in recreational lake level regulation would provide incentive and increased opportunities for recreational activity and improved facilities. Both boating and fishery needs have been considered in the lake level regulation plan.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - With the 30-60A Plan, fish and boat access to the creek and fishing opportunities would remain essentially the same. However, with the 30-60 Plan, creek-to-lake boat and fishery access would be more direct. The creek outlet vicinity would be subject to lake level stages from the lake up to control structure located just upstream of the Route 20A Bridge. Fishing opportunities could improve accordingly. In addition, both the NYS Department of Environmental Conservation and the U.S. Fish and Wildlife Service have recommended provision of parking facilities to improve ice fishing access opportunities in the outlet vicinity. Reference the U.S. Fish and Wildlife Coordination Act Report in Appendix F and Department of the Interior letter in Appendix G.

4.23 Community Cohesion

a. Without Conditions (No Action Alternative Plan)

(1) The Conesus Lake perimeter has been fairly well developed with primarily residential/ recreational structures since about 1950. Many of the residents have been located on the lake for several years and a notable trend and corresponding improvements from seasonal to permanent residences has persisted. The result of this trend is a sense of permanence for the lake vicinity residents. Some local people feel they are close to being crowded out by increases in area population and numbers of visitors.

(2) Conesus Lake itself will continue to act as a cohesive force for people and government agencies with immediate interests in the lake. The population in the development around the lake are bound as a lake community, for the lake characteristics affect them similarly. These lake community residents are, in turn, citizens of the four towns which border the lake. These towns also have expressed interests in the lake. This creates a need for coordinated and cooperative planning where lake issues are involved (e.g., the Conesus Lake Association, the perimeter sewer, etc.). On the other hand, the lake issue may act as a disruptive factor with conflict of interest issues between perimeter populations, developments, and governments, and, upland or regional interests (e.g., the public access issue, county and regional interests, etc.). Both factors must be considered and will play an important part in future community development and planning for the lake vicinity.

b. Lake Level Regulation Plan - It is apparent through public meetings and correspondence that a majority of the citizens that own property on the lake and that have suffered flood damages would prefer an improved lake level regulation plan. Since flooding, environmental, recreational, intake, outflow, and winter level criterion were utilized in developing the regulation plan, no insurmountable conflicts among related interest groups would be anticipated.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Construction of either structural alternative would require acquisition of some land and the relocation of several mobile homes. This would disrupt the community structure as it exists today and could very well result in resentment toward the sponsors of the project and those citizens who support the project. This would be mitigated, however, if the mobile homes and properties could be repositioned and/or redistributed in a similar and equitable manner. (See the section on Displacement of People, Land Acquisition, and Access.) In addition, issues of who suffers and who benefits generally arise and are possibly disruptive toward community cohesion. Local shares are usually an issue. These, however, are generally resolved through local nogotiation by the local sponsor of the project - NYSDEC.

4.24 Institutional

a. Without Conditions (No Action Alternative Plan) - The four towns have agreed to a joint planning board for Conesus Lake. (Livingston County Planning Board 4/80) When this board is implemented, it could serve to coordinate activities concerning the lake between the towns and ensure comprehensive planning for the lake area. This would also mean regulation would continue through the CLA under the current DEC permit. The existing outlet is inadequate to handle the flows necessary to prevent flooding. Therefore, flooding would probably continue to occur periodically.

b. Lake Level Regulation Plan - In lake level management for desired lake levels for recreation, fish and wildlife, water supply, downstream water demand, and flood control, an agency would need to be responsible for operation of the control structure in accordance with the developed regulation plan. The agency selected would be determined primarily by the local sponsor of this project, (NYSDEC). Likely candidates would be NYSDEC, the Conesus Lake Association, the local Department of Public Works, or the joint planning board. The Lakeville Sewage Treatment Plant personnel might operate the control structure within the plan to assure necessary outflows for plant discharge assimilation needs.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - For either structural plan, the Federal Government will design and construct the various features of the selected plan, and will periodically inspect the project. The NYSDEC is the non-Federal (local) sponsor and will be required to enter into a local cooperation agreement. This agreement generally includes: (a) provision by the local sponsor of all lands, easements, and rights of way necessary for construction and subsequent maintenance, and (b) local agreement to maintain and operate the project upon completion, among other items. For a more complete description of the agreement, see "Division of Plan Responsibilities" in Section 2 - Alternatives in this EIS.

4.25 Community and Regional Growth

a. Without Conditions (No Action Alternative Plan)

(1) Livingston County anticipates increased developments in the south town areas of the county. This is expected to result primarily as a result of the completion of the Geneseo Expressway scheduled for 1982. It will provide quick and easy access to the Rochester Metropolitan area and is expected to induce further commercial, industrial, residential, and recreational developments in Livingston County.

(2) The Conesus Lake perimeter and several of the communities in the vicinity, primarily Lakeville, Geneseo, and Livonia, have been designated as urbanizing areas by Livingston County. One would expect continued developmental pressures around the lake in response to many factors that influence such development such as good access (i.e., the Geneseo Expressway), availability of utilities and services, and locational attractions, such as the beauty of the lake, its water-related recreational opportunities, and the improved water quality of the lake.

(3) There is an adopted county comprehensive land use plan which is intended to guide the growth and development in the county. Each town in the vicinity of Conesus Lake also has adopted zoning ordinances which limit the kind of development that can occur in a given area. The zoning in the vicinity of the lake generally permits one or two-family units on the lake shore and on the land side opposite the road (each town has different zoning classifications). New construction and major remodeling on the lake shore will also be governed by the requirements of the flood insurance program. Given present policy and attitudes of both the county and lake residents, it is unlikily that there will be commercial or industrial development on the lake shore or upland area, with the exception of the hamlet of Lakeville. (Appendix B)

b. Lake Level Regulation Plan - Implementation of the Lake Level Regulation Plan would contribute to desirable community growth by providing flood damage reduction measures to existing structures, by providing opportunities for property improvements and some development, and by providing greater assurances of desirable lake levels for recreational and environmental needs.

c. Structural 30-60A or 30-60 Alternative Plan, and Downstream to Route 256 - Construction of either of the structural alternatives would initially create disruption to the lake and Lakeville communities, and particularly to the Conesus Creek Outlet trailer community. It is anticipated, however, that through concerted planning and mitigation efforts that these disturbances will be short term and that resettlement will provide opportunities for even improved conditions. In addition, implementation of either of these plans would provide for implementation of the Lake Level Regulation Plan which, overall, would provide benefits to the Conesus Lake community and in turn to the region.

4.26 Cultural Resources - According to the Cultural Resources Reconnaissance Level Survey Report (on file at the Buffalo District) completed in June 1981, none of the sites or potentially historic structures in the area will be impacted by any of the proposed project actions.

LIST OF PREPARERS

The following people are primarily responsible for preparing this Environmental Impact Statement:

Section/Name	Expertise	Experience	Professional Discipline
<u>Planning Branch</u>			
Charles Zernentsch	Civil Engineering and Planning	Eleven years, U. S. Army Engineer District, Buffalo (Project Manager) (Hydrology and Planning Studies	Civil Engineer
Dave MacPherson	Civil Engineering and Planning	Four years, U. S. Army Engineer District, Buffalo	Civil Engineer
<u>Environmental Section</u>			
James Bennett	Landscape Architecture	Five years, U. S. Army Engineer District, Buffalo (EIS Studies) Fourteen years, Bureau of Indian Affairs Three years, U. S. Forest Service	Community Planner
Leonard Bryniarksi	Natural Resources (Aquatic Biology) (Wildlife Management, Botany)	Eight years, U. S. Army Engineer District, Buffalo (EIS Studies) Twelve years, U. S. Soil Conservation Service, Soil Conservationist and Wildlife Biologist	Ecologist
Philip Frapwell (EIS Coordinator)	Aquatic Biology	Three years, U. S. Army Engineer District, Buffalo (EIS Studies)	Biologist
Tod Smith	Environmental Planning	Three years, U. S. Army Engineer District, Buffalo (EIS Studies and Drafting Technician)	Community Planner
Kathleen McDermott	Social Sciences	One year, U. S. Army Engineer District, Buffalo (EIS Studies)	Social Scientist
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Ronald Guido	Economics	Nine years, U. S. Army Engineer District, Buffalo (Economic Studies) Two years, Department of Commerce (National Income Accountant)	Economist
Jonathan Brown	Economics	Three years, U. S. Army Engineer District, Buffalo (Economic Studies)	Economist

SECTION 5

PUBLIC INVOLVEMENT

PUBLIC INVOLVEMENT PROGRAM

5.01 Coordination between the Buffalo District Corps of Engineers and local interests has been carried out through a public meeting, a newsletter series, the local press, meetings with various agency representatives, and telephone and written correspondence.

5.02 A public meeting was held in the Livonia Central School, town of Livonia, Livingston County, NY, on 25 October 1979. Approximately 150 people attended. The purpose of the meeting was to discuss the status of the study, the most feasible alternatives, and to receive community input. Major concerns expressed were: lake level regulation, timeliness of the study, effects of the Lakeville and Millville control structures on lake levels and sufficient economic justification for construction of the project. At that meeting the CLA accepted responsibility for requesting and compiling information regarding flood damages from effected residents for use in the Corps study.

5.03 Three newsletters have been sent out by the District. On 31 March 1980, approximately 75 copies of the first newsletter were sent to commend area residents for their support in supplying flood damage information, to notify the recipients of the appointment of a new study manager, and to publicize the revised schedule for the study. The second newsletter, dated 18 July 1980, was hand delivered to the trailer park and a follow-up phone call was made to the CLA section representative. This was done because relocation of some trailers will be required with any feasible structural alternative. This resulted in a number of contacts from affected residents. This newsletter contained descriptions of two alternatives for the immediate outlet area and requested that recipients respond and identify the plan they prefer. Approximately 90 copies were mailed or hand delivered to the lake perimeter area. The third newsletter, sent on 30 December 1980, described where the Corps was in the study process, future scheduling, and what local requirements and costs might be. Copies were sent to all on the previous newsletters mailing list and to those individuals who had contacted us between the second and third mailing.

5.04 Local newspapers, The Livonia Gazette and Livingston County Leader, have contributed to public awareness of the study by printing items on the study including the complete text of the newsletter describing the proposed alternatives. Also, the Chairperson of the Public Relations/Newsletter Committee and Executive Board member of the CLA was interviewed regarding social parameters for the Conesus Lake community on 9 June 1980.

5.05 Extensive written and telephone correspondence was carried on between local agencies and the study team. Coordination included the Town Boards of the four surrounding towns, the Livingston County Planning Board, and the CLA.

5.06 A Public Meeting and 404 Hearing were held on 22 July 1981 after the release of the Draft Detailed Project Report, Draft Environmental Impact Statement (DEIS), and Preliminary Section 404 Evaluation as specified in the "Notice of Intent to Prepare a DEIS for Conesus Lake Flood Control Project, Livingston County, New York." This Notice of Intent appeared in the Federal Register, dated 3 December 1979.

REQUIRED COORDINATION

5.07 Coordination with Fish and Wildlife resource agencies is required by the Fish and Wildlife Coodination Act, as amended 16 USC 661 et. seq.; and Endangered Species Act of 1973, as amended, 16 USC 1531 et. seq. Throughout the course of the current study, coordination has been maintained with the Cortland field office of the U. S. Fish and Wildlife Service (USF&WS) and the Region 8, Avon, NY office of the New York State Department of Environmental Conservation (NYSDEC).

5.08 NYSDEC agreed to function as the local cooperator for the study and has worked closely with the Corps since the beginning of the study. They have provided comments on the Reconnaissance Report and coordinated with us on the Scope of Work for the biological studies conducted and they have reviewed and accepted the resulting report.

5.09 Three coordinating meetings have been held at DEC's Avon offices during this phase of the study. On 28 March 1980, DEC and Corps representatives met to discuss lake levels and lake level effects on the DEC-owned marsh at the south end of the lake. The second meeting occurred 23 May 1980 and included F&WS representatives as well. This meeting further discussed lake levels and the DEC marsh, focusing on spawning conditions for Northern Pike. Also discussed was the relative importance of the wetland along the Conesus Outlet at the north end of the lake. A third meeting was held on 1 September 1981, at which NYSDEC, USFWS, and the Corps jointly participated. A mitigation measure (specified in Appendix E) was coordinated for the wetland (Ames parcel) located at the southern end of Conesus Lake.

5.10 The U.S. Fish and Wildlife Service has submitted a Final Coordination Act Report to the Corps dated September 1981. (Reference Appendix F) In addition, a letter dated 31 October 1980 from the FWS indicated that no critical habitat has been designated in New York State and, therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act is required.

5.11 Telephone communication with the U.S. Fish and Wildlife Service (FWS) office in Cortland, NY, on 16 June 1981 revealed that the FWS is continuing coordination with New York State Department of Environmental Conservation, at Avon, NY (NYSDEC) relevant to solving NYSDEC concerns on the Draft Fish and Wildlife Coordination Act Report. A meeting was held between their respective offices on 10 June 1981 to discuss points of fish and wildlife concern expressed by NYSDEC in their letter to Mr. Paul Hamilton, FWS, dated 22 December 1980. Also, additional information regarding the Corps proposed project was sent to the FWS and to NYSDEC in early June in order to continue coordiantion efforts with these agencies on project planning. Letters included in Appendix F from USFWS dated 17 June 1981, and

a letter to USFWS from NYSDEC dated 30 June 1981, reflect the aforementioned coordination meeting and express the mutual resolution, of most concerns, arrived at by the involved agencies. (Reference Section 5.09 and Appendix E.)

5.12 Compliance with Executive Order 11990, Protection of Wetlands, 24 May 1977 - This Executive Order requires that Federal agencies avoid development in wetlands unless no practicable alternative to such development exists. None of the alternatives for Conesus Lake involve development in wetlands, and this Executive Order is complied with for the Conesus Lake study. (Reference Appendix E.)

5.13 Complaince with Executive Order 11988, Flood Plain Management, 24 May 1977 - This Executive Order requires that Federal agencies avoid development in base flood plains unless no practicable alternative to such development exists. It is the policy of the Corps of Engineers to formulate projects which, to the extent possible, avoid or minimize adverse impacts associated with use of the base flood plain and avoid inducing development in the base flood plain, unless there is no practicable alternative. The decision on whether a practicable alternative exists will be based on weighing the advantages and disadvantages of flood plain sites and nonflood plain sites. Factors to be taken into consideration include, but are not limited to, conservation, economics, aesthetics, nature and beneficial values served by flood plains, impact of floods on human safety, locational advantage, the functional need for locating the development in the flood plain, historical values, fish and wildlife habitat values, endangered and threatened species, Federal and State designations of wild and scenic rivers, refuges, and in general, the needs and welfare of the people. Conesus Lake Level Management and flood protection alternatives include structural measures, but have been determined to be the only practicable alternatives. Flood Plain Management policies have been enacted for the area. This Executive Order is complied with for the Conesus Lake study.

5.14 Analysis of Impacts on Prime and Unique Farmlands, CEQ Memorandum, 30 August 1976. This memorandum requires that an analysis be made of the effects of a proposed plan on prime and unique farmlands be made in an EIS. The preferred plans for Conesus Lake do not significantly affect prime and unique farmlands in any manner although such farmlands are present in the general Conesus Lake vicinity, and this memorandum is complied with for the study. (Reference Section 4.13 and pertinent sections in Appendix E.)

5.15 Compliance with the Clean Water Act of 1977, 33 USC 1251 et. seq. - The Clean Water Act requires that the effects of the placement of dredged or fill materials into the waters of the United States be evaluated and include consideration of the Section 404(b)(1) guidelines as described in the Act. An assessment and two (2) Section 404 Evaluations have been prepared and were fully coordinated with the appropriate agencies and individuals. NYSDEC in a letter dated 6 August 1979 (on file at the Buffalo District Office) states that whenever NYSDEC is a local cooperator on flood control projects, they waive the necessity for requiring a 401 Water Quality Certification. NYSDEC is the local cooperator on this proposed project and, therefore, a water quality certificate is not required. An assessment and Section 404 evaluation has been prepared and will be fully coordinated with appropriate agencies and individuals. The 404 evaluation is included in Appendix E.

5.16 Cultural Resources - The requirements for identification and administration of cultural resources are contained in various Federal laws, Executive Orders, and Guidelines. In accordance with the mandates of this legislation, a cultural resources reconnaissance survey is undertaken in the environmental impact area of the project. The draft report was completed in June 1981 and has been reviewed and commented upon by Buffalo District staff, the National Park Service, and the New York State Historic Preservation Office. The final report was submitted to the Corps Buffalo District Office in September 1981.

PUBLIC VIEWS

5.17 The views of local interests in the Conesus Lake area, were expressed through the public involvement, coordination programs previously described, and were incorporated into the study during the planning process. The following is a short summary of some of the views expressed by both Federal and non-Federal interest groups.

5.18 Other Federal Agencies - The U. S. Department of Interior - Fish and Wildlife Service included recommendations in the Preliminary Draft Coordination Act Report as follows: develop a plan to minimize "project-caused erosion, siltation and water pollution;" "mitigate potentially adverse effects of the proposed water control structures on fish movements in and out of the outlet creek;" revegetate disturbed area as soon as possible; restrict construction activities to July through March; coordinate lake levels with USF&WS and NYSDEC; provide more access for ice fishing; and, provide mitigation for lost northern pike spawning habitat.

5.19 Non-Federal Agencies - (NYSDEC) expressed concern about the effect of lake level regulation on the DEC-owned marshes. Biological studies (White and Alldridge, 1980) indicate that the Wildlife Management Area, which is south of Sliker Hill Road, is not dependent on the lake for its water supply, and that lake level regulation will have little, if any, effect on this marsh. The DEC marsh north of Sliker Hill Road will be affected by the lake level management program. (For details of probable impacts, see Section 4, entitled Environmental Effects.) NYSDEC has stated (letter 10 June 1980, Cooper) that "the most critical water level periods will be during the spawning period. If the management plan adequately protects the requirements of each species, the Division of Fish and Wildlife could accept lake level regulation." (Reference Appendix E, Mitigation Measures.) DEC has suggested further coordination on this issue. A further concern was the possible effects of the project on the wetland upstream of the Route 256 Bridge (also known as the "Millville Dam." It is expected that the lake level regulation plan could improve conditions. However, continued existance of the wetland depends on outside factors. Consideration of access for ice fishing in planning and design has been requested by DEC and others. DEC has requested more project design information and suggested continued coordination.

5.20 The general sentiment of the four towns bordering the lake and their citizenry, as expressed through the Public Involvement Program is favorable to Corps of Engineers action. Area concerns were more along the

lines of ensuring that the preferred plan would achieve the goals of preventing flooding, maintaining desirable recreational levels, and ensuring optimum water levels for wildlife habitat.

5.21 The CLA has been a key point of contact for information and for feedback from lake perimeter interests. The Association has strongly supported Federal action since the beginning of the study. On 18 July 1980, the CLA Board of Directors voted in favor of the 30-60 Alternative.

5.22 A list of other public concerns follows. These concerns were identified through previous reports, the study's public involvement program, correspondence, and personal communication.

(a) Flood Related Problems - Damages, costs, safety hazards, etc., caused by periodic flooding on the lake perimeter and at the outlet.

(b) Access to the Lake - Downstream interests are concerned about any Federal projects' impact on their ability to reach the lake by water.

(c) Dislocation of People - Lake outlet modification may require land currently occupied by house(s) or mobile homes.

(d) Target Lake Levels - Lake levels must be controlled to prevent flooding, achieve and maintain desired recreational levels, and ensure optimum water levels for wildlife habitat, - the Millville (Route 256) and Lakeville (existing) control structures and McMillan Creek flows may affect lake levels.

(e) Cost-Sharing - Land acquisition may be required for realignment of the outlet and for channelization of Conesus Creek to improve flow characteristics, - sewer lines will require relocation.

(f) Impact on Water Quality - Currently, there is water stagnation at the north end of the lake.

(g) Amount of Time Required for the Study - Discussion of Conesus Lake flooding problems and the possibility of Federal aid have been carried on since 1956.

(h) Maintaining wetland upstream of the Route 256 Bridge.

(i) Utilize the marsh south of Sliker Hill Road as a holding pond.

(j) Mitigation for lost northern pike spawning habitat.

STATEMENT RECIPIENTS

5.23 The following agencies, groups, and individuals were sent copies of the Draft Detailed Project Report and Draft Environmental Impact Statement for review and comment.

a. Federal:

Advisory Council on Historic Preservation
Federal Energy Regulation Commission
U. S. Department of Agriculture
U. S. Department of Commerce
U. S. Department of Energy
U. S. Department of Health, Education, and Welfare
U. S. Department of Housing and Urban Development
U. S. Department of the Interior
U. S. Department of Transportation (UMTA)
U. S. Environmental Protection Agency

b. State:

Office of the State Archeologist
NYS Department of Commerce
NYS Department of Environmental Conservation
NYS Department of Health
NYS Department of State
NYS Department of Transportation
NYS Office of Parks and Recreation
NYS Office of Planning Services
State Clearinghouse Administrator
State Historic Preservation Officer

c. Legislature:

U. S. Senator Alphonse D'Amato
U. S. Senator Daniel P. Moynihan
U. S. Congressman Barber B. Conable, Jr.

NYS Governor Hugh L. Carey
Honorable Paul L. Kehoe - 52nd Senate District
Honorable John D. Perry - 53rd Senate District
Honorable Audre T. Cooke - 132nd Assembly District
Honorable James F. Nagle - 135th Assembly District

d. Others:

Livingston County Board of Supervisors
Livingston County Planning Board
Livingston County League of Women Voters

Town of Avon
Town of Conesus
Town of Geneseo
Town of Groveland
Town of Livonia

Conesus Lake Association
Conesus Lake Sewer District - Board of Managers
Center for Environmental Information

e. Individuals - A complete mailing list is on file at the U. S. Army Corps of Engineers, Buffalo District Office.

REVIEW OF THE DRAFT DPR AND DEIS

5.24 Filing of the DEIS. The Draft Detailed Project Report (DPR) and Draft Environmental Impact Statement (DEIS) were mailed to all known interested Federal, State, and local agencies as well as interested locals in June 1981. At the same time, the reports were filed with the U. S. Environmental Protection Agency, commencing the 45-day official National Environmental Policy Act (NEPA) review period. The review period extended from 31 July 1981 to 21 September 1981. Copies of all comment letters on the draft reports with corresponding Corps responses are included in Appendix G of this Final Report document.

5.25 Public Views Since Release of the Draft Detailed Project Report and Draft Environmental Impact Statement. Public interests expressed concern for the protection of the wetlands within the project area, for protection or enhancement to fish and wildlife resources at Conesus Lake, and for potential construction impacts in the Conesus Creek outlet area. Concerns were considered in the planning process and revision to the selected plan were incorporated. The Corps in close coordination with the USFWS and NYSDEC developed a mitigation measure that would help compensate for the potential loss of northern pike spawning habitat. Some interests expressed concern pertaining to the impacts of construction in the Conesus Creek outlet vicinity - particularly to properties along the west bank downstream of the Route 20A bridge. These concerns have been addressed in further detail in the FEIS and Appendix G - Comment/Response. Ice fishing access was also further identified as a potential aspect for consideration and parking and access sites have been proposed by the NYS Department of Environmental Conservation. Reference the U.S. Department of the Interior - Fish and Wildlife Service - Coordination Act Report in Appendix F. These proposals were rejected. Reference Comment/Response Section, Appendix G.

All written comments received on the DEIS (postmarked prior to 21 September 1981) and Corps responses are located in Appendix G.

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CONESUS LAKE

DETAILED PROJECT REPORT
AND
FINAL ENVIRONMENTAL IMPACT STATEMENT

INDEX

INDEX (Cont'd)

INDEX (Cont'd)

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX A
HYDROLOGIC ENGINEERING, HYDRAULIC DESIGN, AND FLOOD DAMAGES

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

STAGE III DPR
CONESUS LAKE, NEW YORK

APPENDIX A
HYDROLOGIC ENGINEERING, HYDRAULIC DESIGN,
AND FLOOD DAMAGES

TABLE OF CONTENTS

SECTION A1 - HYDROLOGIC ENGINEERING

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

FIGURES (Cont'd)

PLATES

CONESUS LAKE, NY DPR

APPENDIX A

HYDROLOGIC ENGINEERING
HYDRAULIC DESIGN
AND
FLOOD DAMAGES

SECTION A1 - HYDROLOGIC ENGINEERING

A1.1 GENERAL

A1.1.1 Basin Description

Conesus Lake is the western-most Finger Lake and is located in the Genesee River Basin about 22 miles south of the city of Rochester in the towns of Conesus, Geneseo, Groveland, and Livonia, all of which are located in Livingston County, NY (Plate A1).

The Conesus Lake drainage basin consists of an area of 70 square miles, including the lake surface, which drains through Conesus Creek to the Genesee River. The basin is a north-south valley, roughly rectangular in shape, having an average width of about 5 miles and a length of about 17 miles.

Conesus Lake itself may also be classified as roughly rectangular in shape. The lake has an average width of about 0.6 mile, but narrows to about 0.25 mile in a 1,000-foot reach midway along its 7.8 mile length (Plate A1). The surface area of the lake is about 5.0 square miles at normal water level. The southern half of Conesus Lake has an average depth of about 50 feet, while the average depth in the northern half is about 38 feet. A shallow area having a maximum depth of about 10 feet extends about 2,500 feet from the northern shore. Immediately to the south of the lake is a wooded marshy area consisting of about 1,000 acres, which floods during periods of high runoff.

The runoff from the watershed is passed directly to the lake by overland flow from the steep valley slopes and by numerous small tributaries of relatively short length. Conesus Inlet, the longest stream entering the lake at the southern end, has a total length of about 6.5 miles. The runoff from the watershed is quite flashy due to the limited upland storage capacity and due to the relatively high surface gradient. This runoff is normally of short duration but peak discharges may often be substantial.

Conesus Creek is the only outlet from Conesus Lake, and runs generally north for a total distance of 10.6 miles until it meets the Genesee River near Avon, NY. The Conesus Creek watershed is approximately 92 square miles in area at this point.

A1.1.2 Existing Control Structure

There was no formal regulation of the levels of Conesus Lake until November 1964, when a control structure was built on Conesus Creek, about

1,400 feet downstream from the lake. The structure is 4 feet high by about 20 feet wide, and consists of sheet piling, channels, and wooden stoplogs which are removed and replaced manually. A sluice gate, approximately 2.5 feet wide by 4 feet high, is located at the east end of the control structure and is raised and lowered manually to regulate low flows in the outlet. The New York State Department of Environmental Conservation (DEC) permit for the structure states that the stoplogs must not be put in before 15 April and must be removed by 15 October. A minimum downstream flow of 10 CFS must be maintained at all times, primarily for use in waste assimilation at the sewage treatment plant, located 5,000 feet downstream from the control structure.

A1.1.3 Summary of Studies

The following is a brief summary of studies performed for the Conesus Lake DPR:

(1) Development of unit hydrograph, loss rate parameters, time area curves, and routing coefficients.

(2) Development of rating curve for existing control structure.

(3) Development of hydraulic design of improved control structure, outlet works, and channel to allow for greater releases at a lower elevation, as an aid for increased operation capability.

(4) Development of monthly and daily inflows, using rating curves, area-capacity curves, and daily lake levels from October 1940 to January 1980.

(5) Development and evaluation of lake management plans (target rule curves).

(6) Calculation of benefits.

(7) Calculation of Standard Project and Probable Maximum Floods.

A1.1.4 Climatology

The aerial and temporal distributions of precipitation over the Conesus Lake watershed are represented by a first order weather station located at the Rochester-Monroe County Airport, two hourly precipitation gages located at East Bloomfield and Mount Morris, and three daily precipitation gages located at Avon, Dansville, and Hemlock, all located in New York State. The approximate location of these precipitation gages are shown on Plate A2.

Records for the Rochester gage have been kept since 1872 for temperature, 1829 for precipitation, and 1941 for snowfall. The extremes for this period are: temperature, a high of 100°F and a low of -19°F, and precipitation, a maximum monthly of 9.70 inches and a minimum monthly of 0.22 inches. The maximum monthly snowfall was 64.8 inches. For the period of record of 1940 through 1979, normal annual and monthly values of

precipitation, snowfall, and temperature were obtained for the Rochester gage. The 40-year normal annual precipitation is 32.63 inches. The monthly averages range from a low of 2.39 inches in February to a high of 3.08 inches in June. The 40-year normal annual snowfall is 89.1 inches. The maximum monthly average snowfall is 22.9 inches, occurring in January. The 40-year normal annual temperature is 47.8 degrees, with July being the warmest month (71.3°F) and February the coldest month (24.4°F).

A1.1.5 Water Supply

Conesus Lake serves as the source of water for several communities in Livingston County. The villages of Avon and Geneseo, the hamlets of Lakeville, East Avon, Retsoff, and York, and individual households surrounding Conesus Lake, all rely on the lake for water supply. Avon, Geneseo and Lakeville maintain their own pumping facilities on the lake. Both Avon and Geneseo are authorized to withdraw a maximum of 3 million gallon per day(MGD). East Avon and the York Complex purchase their water from Avon and Geneseo, respectively.

Table A1 shows the New York State Department of Environmental Conservation's estimate of the water supply requirement for this area.

Table A1 - Water Requirements

	Population		DEMAND - MGD			
			1990		2020	
Community	1990	2020	Average Daily	Peak	Average Daily	Peak
Avon Complex	5,800	9,200	2.22	3.33	3.38	5.06
Lakeville	2,400	2,800	0.30	0.45	0.35	0.53
Conesus Lake Communities	10,200	16,000	1.02	1.53	1.60	2.40
Geneseo	13,500	22,000	1.81	2.72	3.46	5.19
York Complex	3,050	4,600	0.48	0.73	0.83	1.24
Total	34,950	54,600	5.83	8.76	9.62	14.42

A1.2 HISTORICAL FLOODS

A1.2.1 General

The majority of flooding occurs in late winter/early spring. Lake level records compiled by the USGS and the village of Geneseo for the period 1930 to present indicate that 41 out of 50 of the annual maximum lake levels have occurred from December through April, with five in May, three in June, and one in September.

Flooding results principally due to insufficient outlet capacity of the existing control structure and channel, which precludes lowering the lake sufficiently each winter to provide storage capacity below damaging levels. There would be sufficient storage capacity in the lake if lake levels could be lowered further between October and February. Even though the stop logs of the existing structure are removed by the 15th of October, there is insufficient outlet capacity to bring the lake levels down appreciably prior to spring runoff.

A1.2.2 Notable Floods

Significant flooding on Conesus Lake has occurred in the years 1930, 1936, 1954, 1960, 1972, 1976, and 1977. The 1972 flood resulted from Tropical Storm Agnes. Damages for a recurrence of this event are estimated to be around $620,000 based on March 1979 price levels and condition of development around the lake. The peak daily lake elevations in feet, NGVD, for the above events are as follows.

(1)	March 1930	820.65
(2)	March 1936	820.65
(3)	May 1954	821.32
(4)	March 1956	822.07
(5)	April 1960	820.82
(6)	June 1972	822.50
(7)	March 1976	822.05
(8)	September 1977	821.41

A1.2.3 Future Floods

Floods of the same or larger magnitude as those that have previously occurred could also occur in the future. Proportionately larger floods have been experienced in the past on streams and lakes with characteristics similar to those found in the study area. Combinations of rainfall and runoff which have occurred in those watersheds are also possible in the Conesus Lake watershed.

A1.3 GAGING STATIONS

A1.3.1 Stream and Lake Gages

A stream gage was operated on Conesus Creek from October 1919 to September 1934, located on the abutment of the Millville Bridge (Rt. 256), 1.5 miles downstream from Lakeville, NY. Data from this gage was not used in this study because it predates the lake level data.

A lake level gage is located on the west shore of Conesus Lake at the Geneseo Water Works pumping station. The USGS has kept daily records from July 1963 to the present. From 1940 to July 1963, daily records were kept by the village of Geneseo. Annual peak daily lake levels are given in Table A2, and the location of the gages is shown on Plate A1.

A1.3.2 Precipitation Gages

As mentioned in paragraph A1.1.4, there are six precipitation gages located in the proximity of the Conesus Lake watershed. Listed below are the total precipitation amounts for some of the more notable rain storms in the basin.

(1) June 1972 (Tropical Storm Agnes, 20-25 June)

(a)	Avon	4.78 Inches	(d)	Hemlock	6.14 Inches
(b)	Dansville	7.79 Inches	(e)	Mount Morris	6.27 Inches
(c)	East Bloomfield	5.44 Inches	(f)	Rochester	4.18 Inches

(2) April 1973 (30 March through 7 April)

(a)	Avon	2.86 Inches	(d)	Hemlock	2.79 Inches
(b)	Dansville	2.92 Inches	(e)	Mount Morris	2.21 Inches
(c)	East Bloomfield	3.21 Inches	(f)	Rochester	2.19 Inches

(3) September 1977 (24-27 September)

(a)	Avon	1.95 Inches	(d)	Hemlock	2.04 Inches
(b)	Dansville	1.92 Inches	(e)	Mount Morris	2.81 Inches
(c)	East Bloomfield	1.91 Inches	(f)	Rochester	2.05 Inches

A1.4 MAJOR FLOODPRONE AREAS

Flooding that affects cottages, homes, docks and grounds around Conesus Lake and along its outlet has been reported as occurring generally in the spring. However, the worst flood of record was a result of Hurricane Agnes and occurred in June 1972. Flood damage begins on Conesus Lake at an elevation of about 819.5 (N.G.V.D.). The floods of 1972 and 1956 had peak elevation of 822.50 and 822.07. These floods affected about 1,300 cottages and homes around the lake.

The reach of the outlet channel, about 1.5 miles between the lake and State Route 256, hydraulically, is in extremely poor condition, being sharply curved and obstructed by trees, brush and debris. An existing weir under the Millville bridge on Route 256 raises the water surface about 5 feet, resulting in a very flat hydraulic gradient for about 5,000 feet upstream of Route 256.

A detailed damage survey was conducted by the Buffalo District during March-April 1979. Various areas adjacent to the lake were surveyed, and a cumulative stage-damage curve was prepared for the whole lake.

Table A2 - Annual Peak Daily Lake Levels
(Datum - NGVD)

Water Year	Date	Maximum Lake Elevation	Water Year	Date	Maximum Lake Elevation
1930	3/30	820.65	1955	3/12-17/55	820.32
1931	4/31	818.48	1956	3/9/56	822.07
1932	4/32	818.98	1957	4/12/57	819.82
1933	4/33	820.07	1958	4/16/58	819.90
1934	4/34	817.40	1959	4/9-12/59	820.40
1935	5/35	817.82	1960	4/1-5/60	820.82
1936	4/36	820.65	1961	4/26-27/61	820.48
1937	6/37	819.15	1962	4/14-17/62	819.40
1938	4/38	818.07	1963	4/4-5/63	819.82
1939	4/39	817.90	1964	4/8-10/64	819.98
1940	4/40	819.92	1965	4/21-23/65	819.31
1941	4/7-9/41	819.65	1966	3/14-16/66	819.59
1942	3/18-19/42	820.40	1967	5/16/67	819.59
1943	5/27-29/43	819.82	1968	4/6-7/68	819.55
1944	4/14-20/44	818.65	1969	4/25-29/69	820.39
1945	3/25-27/45	820.32	1970	4/6-9/70	819.99
1946	12/10-15/45	819.32	1971	3/17-18/71	820.53
1947	4/24/47	819.73	1972	6/24/72	822.50
1948	3/23-27/48	819.07	1973	4/7/73	820.86
1949	4/9-27/49	817.82	1974	4/15/74	819.53
1950	3/30/50	820.07	1975	3/25-26/75	819.75
1951	3/8-11/51	820.15	1976	3/5/76	822.05
1952	4/17-19/52	819.65	1977	9/27/77	821.41
1953	4/1-2/53	819.73	1978	12/2/78	820.58
1954	5/4/54	821.32	1979	3/8/79	820.20

A1.5 RAINFALL-RUNOFF ANALYSIS

A1.5.1 General

In all water resource studies, it is of prime importance to establish the nature of the hydrologic responses of a watershed to precipitation and snow melt. Basic hydrologic parameters used to describe these relationships are time-area curves, routing coefficients, loss rate relationships, and unit hydrographs and their characterizing parameters. This section of the report will deal with the development of these hydrologic parameters. As detailed later in this appendix, some of these parameters will be used to determine the Standard Project Flood (SPF) and Probable Maximum Flood (PMF) at the outlet of the lake.

A1.5.2 Time-Area Curve

A time-area curve was developed at the outlet of Conesus Lake. The curve was developed by measuring travel distance on the numerous tributaries to Conesus Lake and connecting points of equal travel distance. Increments of 0.5 miles were used to draw the isochrones on USGS' 7-1/2 minute topographic maps. The areas of equal travel distance (or time) were then planimetered and used to form the time-area curve. This time-area curve can be found as Figure A1.

A1.5.3 Unit Hydrographs

The unit hydrograph and loss rate parameters for Conesus Lake at the lake outlet were developed using two storms, June 1972 and April 1973, and the optimization routine of computer program HEC-1 (723-X6-L2010) developed by the Hydrologic Engineering Center of the Corps of Engineers, Davis, CA. The June 1972 storm flood hydrograph and rainfall pattern can be found on Figure A2. The April 1973 storm flood hydrograph and rainfall pattern can be found on Figure A3. The reproduction of these storm events, using the derived unit hydrograph and loss rate parameters, are also presented on these two figures.

To develop the inflow hydrographs for these two storms, the lake stage hydrographs (1 hour reading for June 1972, 2 hour reading for April 1972) for these events and the rating curve for the existing control structure were used to determine discharge hydrographs through the control structure. Using the area capacity curve for the lake (Figure A4) and the equation that the change in storage over the time increment (Δt) is equal to inflow-outflow, S = $(I-Q)X\Delta T$, the outflow hydrograph through the control structure was reverse routed to calculate the inflow hydrographs. The inflow hydrographs were then used in the HEC-1 computer model to determine the unit hydrograph and loss rate parameters.

The April 1973 and June 1972 flood hydrographs were first analyzed separately. After reviewing the results of these two analyses, the loss rates from the optimization of the April 1973 storm were used in the optimization of the June 1972 storm. This resulted in a much better fit for the June 1972 hydrograph. Comparison of the unit hydrographs (Figure A5), resulted in selection of the June 1972 unit hydrograph as the recommended

Rev 9/81

unit hydrograph. The April 1973 event was a small magnitude event as compared to the June 1972 event. Since the unit hydrograph and loss rate parameters are to be used to calculate the SPF and PMF, the unit hydrograph developed from the largest documented storm and flood available was selected.

A1.5.4 Routing Criteria

Since the majority of the damages were centered around Conesus Lake, and due to the lack of any developed downstream area that could be affected by a change of operation of Conesus Lake, routing coefficients were not used.

A1.6 INFLOW CALCULATIONS

Daily lake elevations for Conesus Lake were obtained for the period 1 October 1940 to 22 January 1980. These elevations were then used to calculate the daily outflow from Conesus Lake. An area-capacity curve for Conesus Lake was used to convert the elevations for Conesus Lake into storage quantities (acre-feet). From the outflows and change in storage, the daily inflows to Conesus Lake for the entire period of record were calculated. The equation: Change in Storage/Unit of Time = Inflow-Outflow, was used to determine the inflows. All losses such as evaporation, net ground water seepage, water supply, etc., were lumped together (net losses). These net losses were not calculated because it was assumed that these losses would remain constant during a change in operation of Conesus Lake. This is a fair assumption because the Conesus Lake surface area does not change rapidly over a change in elevations, thus the losses would not change much over a change in lake elevations.

The daily inflows were calculated by using a computer program developed by the Buffalo District. This computer program calculates the inflows given only the lake elevations, an area-capacity curve, and any number of rating curves. The use of different rating curves allows for the adjustment of outflows which would occur due to a change in operation (i.e., closing and opening gates, use of stog logs, etc.) or a change in control structures.

Once the daily inflows are calculated, another computer program was used to convert daily inflows into monthly inflows. A tabulation of the average monthly inflows by month can be found as Table A3.

Table A3 - Average Monthly Inflows
(For the Period 1 October 1940 to 31 December 1979)

January	74 CFS
February	100 CFS
March	198 CFS
April	155 CFS
May	100 CFS
June	57 CFS
July	20 CFS
August	22 CFS
September	23 CFS
October	32 CFS
November	48 CFS
December	78 CFS

A1.7 HEC-5 MODELING

A1.7.1 General

Various measures were investigated to develop a plan of improvement to reduce flooding on Conesus Lake. Various stream channel and control structure modification plans were given preliminary consideration. These plans are:

(1) 30-60 Plan

(2) 50-120 Plan

(3) 60 Plan

(4) 90 Plan

(5) 110 Plan

(6) 30-60 "A" Plan

A cursory evaluation of these plans showed that only two plans, the 30-60 and 30-60 "A" plans, to be economically viable. The 30-60 plan was

chosen as the outlet improvement plan to be used in the lake management alternative. A description of this plan can be found in Section A2. Further discussion of the reasons behind the selection of the plans can be found in the main report.

Lake management plans or target rule curves were developed to help control flooding on the lake, and to provide stable lake level for fisheries. There were six basic target rule curves that were evaluated. The target rule curves varied only in the month in which different target levels for conservation levels were to be met. The six target level curves are shown in Figure A6. Although the terms lake management plan and target rule curve are synonymous, a lake management plan must not be confused with a lake management alternative. The lake management alternative is comprised of two components, a target rule curve and an outlet improvement, in this case the 30-60 plan.

A1.7.2 Lake Management Plans

Conesus Lake is a natural reservoir, so the Hydrologic Engineering Center's computer model, HEC-5, Simulation of Flood Control and Conservation Systems (723-500), is well suited for use in its analysis. The HEC-5 model allows for: use of target level curves, diversions such as water supply, and downstream flood control protection or low flow discharges. It is able to use variable time periods within a single simulation run, and is very easy to prepare. Two basic HEC-5 models were used, one that was strictly a monthly model and one that uses a combination of monthly and daily inflows. The monthly HEC-5 model was used to evaluate the performance of the lake management alternative in regard to meeting conservation levels. The monthly-daily model was used to evaluate the performance of the lake management alternative during flooding conditions.

A1.7.3 Target Levels

The target level concept is a set of model constraints whereby the program data input includes some sort of "rule" for determining releases and lake elevations. The target levels used in the Conesus Model consist of four basic levels, the top of the inactive zone, the top of the buffer zone, the top of conservation zone, and the top of flood control zone. These four levels can be seen on Figure A7. The top of the inactive zone would be the elevation of the invert of the lowest control devise on the lake. Below this level there could be no discharge through the outlet works. The buffer zone is a "buffer" between the inactive and conservation zones. The buffer zone acts as an indicator of the degree to cut back unnecessary releases to bring the reservoir back up to the conservation zone. The top of conservation zone is the desired or optimal elevation that the reservoir should be kept at. The top of flood control is the elevation at which flooding starts to occur, or the top of the volume reserved for flood waters.

The first priority of reservoir operation is to control releases to bring the reservoir to the top of conservation level. The volume represented by the zone between the top of the conservation zone to the top of flood control zone is the flood storage area, where inflows greater than the release capacity of the control structure can be stored safely without flood damages

to shoreline property or property on the reservoir outlet. The buffer zone is basically a subzone of the conservation zone. When the reservoir is in the conservation zone, releases for such activities as low flow requirements, navigation, and recreation can be met. If the demands on the system (release demands) exceed the inflow and the water in storage, some guide is needed to determine the degree of cut-back on releases. The buffer zone is this guide. The buffer zone for a single reservoir is not a critical element of the target rule curve. The buffer zone is most important where you have a system of reservoirs, and the operation of the reservoirs must be "balanced" to meet downstream needs.

The tops of each of these zones are set by the physical or environmental constraints on the system. For Conesus Lake, the tops of inactive, buffer, and flood control zones were established using the physical constraints of Conesus Lake. The three levels remain constant throughout the year. The top of conservation zone, which varies month by month, was established using a combination of environmental and physical factors, including flood control, fishery enhancement, and recreation levels. Differences in the rule curves investigated are primarily due to variations considered in the top of the conservation zone.

The range of elevations to which the top of conservation zone could vary is quite small. Due to the physical constraints of the outlet channel, the top of conservation zone could never be below 816 feet (NGVD). Due to low flow requirements, an elevation of 816.5 feet (NGVD) was chosen to be the lowest the top of conservation zone could be. Since flooding on Conesus Lake begins at elevation 819.5 (NGVD), the top of conservation zone should be below this level. Since there should be some flood control storage between the top of conservation and top of flood zones at all times, the upper limit of the top of conservation zone was set at 819 feet (NGVD). Supporting elevation 819 as the upper limit was residents' complaints of swamp-like conditions along the perimeter of their lakefront property when the lake goes above elevation 819.

The varying water resource needs can be better met by varying the top of conservation zone between 816.5 feet and 819 feet during the year. The amount of storage between 816.5 and 819 is approximately 2.5 inches of runoff from the watershed. During the months of low recreation activity, November through April, it is advantageous to keep Conesus Lake as low as possible, say at 816.5 feet. This would allow storage for flood control. During the recreation season, May through October, it is advantageous to keep the lake as high as possible, say at 818.5 feet. During the period March through April, it would be beneficial to raise the lake level to 819 feet as soon as conditions permit, in order to allow the fishery of Conesus Lake access to the spawning areas.

Since the different activities have different requirements, some conflicts can arise. During the spring snowmelt, for flood control purposes, Conesus Lake should be kept as low as possible. However, the spawning period for the fish in Conesus Lake corresponds to this period of snow melt, and for the spawning period, the lake should be as high as possible.

It was such conflicts that necessitated the variation in the target rule curves. The development of the six target levels and the selection of the recommended lake management plan can be found in the following paragraphs.

A1.7.4 Basis of Comparison Alternative

Prior to November 1964, Conesus Lake was not regulated by man. In November 1964, the present control structure was built, enabling partial regulation of the lake. The present control structure has the effect (with the stop logs in place) of maintaining high lake levels during the summer months. The control structure was not in existence for the entire period of record used, so there are two realms of data: pre-November 1964 and post-November 1964. To insure a continuous period of record, the monthly and monthly-daily HEC-5 computer models were run to simulate conditions with the existing control structure for the whole period of record. The results of the monthly run can be found on Figure A8. The stage-frequency and discharge-frequency curve developed for the basis of comparison alternative are discussed in Section A1.8, FLOOD PROBABILITY. The recommended lake alternative will be evaluated against the basis of comparison alternative to determine benefits.

The basis of comparison alternative uses a lake target rule curve based on the DEC permit. The target rule curve is based on the top of conservation zone being at 819 for the months of May through October and at 816.5 for the months of November through April. The recommended lake management alternative, as discussed in Section A1.7.5, was used as a target rule curve in conjunction with the existing control structure to see if any improvements would occur. The results of this test can be found as Figure A9. As discussed in Section A1.7.5, there are little differences between lake rule curves for flood control under improved conditions. The same holds true for the difference between the lake management alternative based on the DEC permit and the recommended target rule curve for flood benefits. As can be seen by comparing Figures A8 and A9, for the existing control structure, there are little beneifts in changing the target rule curves with the existing control structures. This holds true for both conservation and flood control improvements. Thus, any improvements to the Conesus Lake operation must come about by a change in the outlet control structure.

A1.7.5 Lake Target Rule Curves - Conservation Evaluation

The monthly model using HEC-5 was developed to evaluate the effects of the proposed alternatives on conservation needs. The monthly model allows for the evaluation to be based on the same time period (monthly intervals) which are easier to work with. The evaluation of the lake target rule curves using the monthly model was based on meeting the goals of flood control storage, recreation levels, and fishery levels. The six lake target rule curves were tested on their performance in meeting the target rule curve for each plan. Average monthly elevation and the low and high average lake levels for each plan (for each month) were developed and compared to the target rule curve. Each lake management plan was checked for performance during flooding by using the monthly-daily HEC-5 model.

Since there was little difference in the benefits accrued from flood control for each of the six lake target rule curves, the selection of the recommended lake target rule curve was based entirely on the plan that best meets conservation needs. The discussion of the monthly daily model follows in the next section.

The first target rule curve formulated can be found on Figure A6 (curve a). This curve brought the top of conservation zone down to elevation 816.5 for the months of November, December, January, and February. On 1 March the lake would be allowed to rise to 819 feet and stay there to the end of May. The top of conservation zone would then be lowered to 818.5 feet for the rest of the summer until the end of September. The lake would begin its descent to 816.5 feet during the month of October. It must be remembered that due to limited outlet capacity and the natural runoff processes of the watershed, no lake regulation plan can meet the target curve instantaneously. For these reasons, Conesus Lake will not reach the minimum level until toward the end of February and the actual minimum may be somewhat above 816.5 feet. The same holds true with raising the lake. It is possible that there will not be enough inflows to raise to lake level to meet the March conservation level of 819 feet. For this reason it may take until May to get up to the level of 819. During the summer months, when inflows are lowest, it is possible that the conservation level of 818.5 may not be maintained. The evaluation of the first lake management plan took these considerations into account. Plots of the average monthly levels and high and low monthly levels resulting from the target rule curve (Figure A10), showed that the average monthly lake level would fall below the top of conservation zone more than was desirable during the months of July, August, and September. Therefore, this rule curve was modified to extend the 819-foot top of conservation level through the month of June (curve b on Figure A6). All the lake management plans were developed by modifying the first trial target rule curve.

Plots of the average monthly lake levels and high and low monthly lake levels from the computer model run show that the average monthly lake level continues to drop more than desired during the months of August and September. To counteract this effect, the lake levels during the months of July, August, and September (top of conservation zone) were raised to 818.75 (curve c on Figure A6). Regulation under these constraints would not maintain the average monthly lake levels desired in August and September. The results of these two target rule curves can be seen on Figures A11 and A12.

In an attempt to keep the average monthly lake levels up during the months of July, August, and September, the top of conservation zone elevation of 818.5 feet was extended through the month of October (curve d on Figure A6). The desired lake level during the months of August, September, and now October (results can be seen on Figure A13) again could not be maintained, probably because the plan was releasing excess water at the beginning of the spring runoff. Also, environmental concerns indicated that they would like to see the lake reach 819 feet in the month of March.

Another target rule curve was developed (curve e on Figure A6) which addressed these concerns. This curve had the top of conservation zone at 816.5 feet for the months of November, December, and January. The top of

conservation was set as 819 feet for the months of February, March, April, May, and June, and at 818.5 feet for the months of July, August, and September. During the month of October, the top of conservation zone was lowered from 818.5 feet to 816.5 feet. The plots (Figure A14) of average monthly lake levels, and high and low lake levels derived from the computer model show appreciable improvement. It seems that the previous target rule curves were allowing too much water to be released during the spring runoff.

One more target rule curve was attempted. This curve (curve f on Figure A6) extended the 818.5-foot top of conservation zone through the month of October. The plot of the average monthly lake level, and high and low lake levels from the computer model, gave the closest fit to the target rule curve. The results are found on Figure A15. For this reason, target rule curve f from Figure A6 is the recommended lake management plan for Conesus Lake. The alternative of lake management uses the 30-60 plan of improvement for the lake control structures. All target rule curves evaluated in this section, and the section on the monthly-daily computer model, are based on the 30-60 plan of improvement to the outlet control works.

A1.7.6 Lake Target Rule Curves - Flood Control Evaluation

To evaluate the performance of the six target level curves during periods of historical flooding, a monthly-daily inflow HEC-5 computer model was adopted. The monthly-daily model used monthly inflows, except during the periods of historical high lake levels on Conesus Lake. These periods of high lake levels correspond with the annual peak lake levels. Around the time of each historical event, daily inflow hydrographs were investigated to find the beginning and end of the event. Then whole months of daily inflow values were substituted for the monthly values. Each target level curve was then evaluated using this monthly-daily model and the results compared. The peak elevation for each event was calculated by the computer model for each target curve. These annual peak elevations were used to calculate the new stage-frequency curves under improved conditions. Each of the stage-frequency curves for all six target rule curves were nearly identical, so there was no advantage of one target rule curve over another for flood control. The stage-frequency curves for all six target rule curves are not presented in this report. The stage-frequency curve for the recommended lake management plan and control structure plan is discussed in Section A1.8.1.

The lake management alternative was very efficient in reducing lake levels. Two large events on Conesus Lake, the June 1972 event and the March 1976 event, are reproduced graphically on Figures 16 and 17 to show the effects of the alternative on lake levels.

A1.8 FLOOD PROBABILITY

A1.8.1 Stage-Frequency Curves

Stage-frequency curves were developed by using as annual peak elevations the highest daily elevation compiled for the recommended lake management plan and the basis of comparison alternative runs of the HEC-5 monthly-daily model. In most cases, the monthly peak elevation (usually the

top of conservation zone elevation of 819 feet) is higher than the daily peak elevation for the same year. In these cases, the monthly value can be substituted for the daily value, but this was not done in this report. The basis of comparison and recommended lake management plan stage-frequency curve can be found on Figure A18.

Tropical Storm Agnes, due to its irregular path through the central New York State area, produced flooding with varying degrees of frequency. For the lower Genesee River Basin, of which Conesus is part of, frequencies at river gages ranged between return intervals of 10-60 years. In the adjacent Oswego River Basin, return intervals for the various lakes in the basin ranged from 20-125 years. Therefore, the plotting position of the 1972 event on Conesus Lake is appropriate.

A1.8.2 Discharge-Frequency Curves

Discharge-frequency curves in the outlet were developed for the recommended lake management plan and the basis of comparison plan. The discharge-frequency curves were developed using the guidelines established in Bulletin #17A, "Guidelines for Determining Flood Flow Frequency," by the United States Water Resources Council, June 1977. The annual peak discharges were taken from the monthly-daily HEC-5 computer models. The two discharge-frequency curves can be found on Figure A19.

Peak discharges for each year were plotted using the median plotting position method to develop discharge-frequency curves. As can be seen on Figure A19, the discharge-frequency developed by Bulletin 17A, fits the plotted points well. Therefore, it was decided to use the Log Pearson Type III method to describe the discharge-frequency curves.

The discharge-frequency curve developed for the lake management plan was developed using the 30-60 plan of channel improvement. This 30-60 plan assumes that the culverts under the Route 256 bridges will be completely unplugged. These culverts, when plugged, help maintain the water level for the wetlands located upstream of the Route 256 bridge. It is very likely that if these culverts were left unplugged, the wetlands would slowly disappear. For this reason, the monthly-daily computer model using the lake management plans was run using the 30-60 plan which assumed the culverts closed. The stage-frequency curve resulting from this run shows little difference from the results for the 30-60 plan with culverts open. There are only small differences in the two stage-frequency curves below an event of the magnitude of June 1972, the highest of record. For this reason, it would be possible to leave the culvert plugged until forecasters predict large events on Conesus Lake. The culverts can then be unplugged for the duration of the flood event, then be plugged again.

A1.9 STANDARD PROJECT AND PROBABLE MAXIMUM FLOODS

Standard Project Flood (SPF) and Probable Maximum Flood (PMF) estimates were calculated at the outlet of Conesus Lake. The SPF is a hypothetical storm based on "the most severe meteorologic conditions considered reasonably characteristic of the geographic region involved." The PMF is another

hypothetical storm based on "the most severe meteorological event reasonably possible in the geographic region involved." An SPF peak inflow can be about 40-60 percent of a PMF.

The SPF inflow hydrograph was calculated using the SPF option of the HEC-1 computer model. The unit hydrograph and loss rate parameters discussed in Section A1.5.3 were used. The SPF index was calculated using the guidelines established in Civil Engineer Bulletin No. 52-B (EM 1110-2-1141). This index is the amount of standard project storm rainfall that will fall over a 200 square mile watershed in 24 hours. Using an SPF index of 11.00 inches, the total computed amount of rainfall over the Conesus Lake Watershed would be 12.75 inches. The SPF index rainfall is adjusted by the HEC-1 program to reflect watershed size and the duration of the storm. The total runoff from the SPF event would be 9.89 inches. Peak SPF inflow calculated would be 39,500 CFS. The SPF uses 1 hour time periods as opposed to the monthly and daily time periods used for the earlier HEC-5 computer model runs.

The PMF inflow hydrograph was calculated using the PMF option of the HEC-1 computer model. The unit hydrograph and loss rate parameter discussed in Section A1.5.3 were used. The PMF flood indexes values of the Probable Maximum Storm (PMS), and the values of R6, R12, R24, R48, R72, and R96 were calculated using the guidelines established in Hydrometeorological Report No. 51 (HMR #51), "Probable Maximum Estimates, United States East of the 105th Meridian," U.S. Department of Commerce, June 1978, and Preliminary HMR #52, "Application of Probable Maximum Precipitation Estimates, United States East of the 105th Meridian," National Weather Service, November 1979.

The PMS is the rainfall that will fall over a 200 square mile watershed in 24 hours. The value of R6, R12, R24, R48, R72, and R96 represent the percent of the rainfall falling over Conesus Lake in the time period of 6, 12, 24, 48, 72, and 96 hours compared to the PMS index. The values are:

PMS - 21.40 Inches
R6 - 88%
R12 - 102%
R24 - 112%
R48 - 126%
R72 - 134%
R96 - 137%

Using the PMF option of HEC-1, the total rainfall was 25.13 inches, with the total runoff being 21.19 inches. The peak PMF inflow would be 83,500 CFS. A 1-hour time period was used for the PMF hydrograph calculated.

The SPF and PMF hydrographs were then used with a HEC-5 computer model to calculate the SPF and PMF elevation on Conesus Lake. Both the Basis of Comparison (BOC) alternative and the recommended Lake Management Plan (LMP) were evaluated under SPF and PMF conditions. One problem encountered in applying the SPF and PMF flood was the selection of an appropriate elevation of Conesus Lake at the beginning of the storm for both the BOC and LMP. This was resolved by assuming that the lake elevation would be the peak elevation found for Tropical Storm Agnes under both the BOC and LMP. This would assure

that the SPF and PMF flood hydrographs occur with the worst possible historical elevation occurring on Conesus Lake. Using this criteria, the effects of the SPF and PMF on the BOC and LMP are as follows:

	Basis of Comparison		Lake Management Plan	
	Elevation, ft. (NGVD)	Discharge	Elevation, ft. (NGVD)	Discharge
Standard Project Flood	829.4	6,850 CFS	827.2	5,600 CFS
Probable Maximum Flood	837.0	16,500 CFS	835.0	15,000 CFS

Backwater analysis was used to determine the rating curve used in calculating the SPF and PMF outflow hydrographs on Conesus Lake. With the high outflows and lake elevation encountered during the SPF and PMF, control of Conesus Lake moves from the control structure to the natural limitations imposed on outflows in the outlet by channel restrictions.

The SPF inflow hydrograph, the outflow hydrographs for exisitng (BOC) and improved conditions, the lake elevations under existing (BOC), and improved conditions are presented on Figure A20.

A1.10 DAM BREAK ANALYSIS

Using equation (1), page 5 of "Research Note No. 5, Guidelines for Calculating and Routing a Dam-Break Flood," complete failure of the control structure under maximum head (3 feet), will induce a peak discharge of 525 cfs, well within the improved channel capacity.

A1.11 OPERATION OF CONTROL STRUCTURE

The operation of the Conesus Lake control structure will be different from the operation of a flood control reservoir. Normally, a flood control reservoir is operated to reduce flood damages on downstream reaches of the outlet. This type of operation calls for the control of releases from the reservoir, thus, when inflows to the reservoir are greater than the channel capacity, the reservoir (taking into account downstream flow conditions) will start to store the excess flood waters. When the inflows to the reservoir become less than channel capacity, the reservoir will release the water in the flood control pool to bring the reservoir back down to the conservation pool level as soon as possible.

For conservation operation, the water in the conservation pool is allocated to the various demands as long as the pool remains above the buffer zone. The initial reservoir size was determined by calculating the required storage to satisfy all demands during the critical drawdown period. The reservoir would then just be large enough to meet the combined storage demands of the conservation pool and flood control pool.

Conesus Lake, being a natural lake with some control of the lake level influenced by man, will be operated nearly just the opposite of the flood

control reservoir. During conservation operation (summer and early fall months), Conesus Lake will be operated to keep the lake as close to the top of the conservation zone as possible. For flood control, the objective would be to spill as much water as possible through the outlet to keep the lake below flood damage levels. Through a combination of winter drawdown and greater release capability, the proposed plan will be able to better control the lake levels on Conesus Lake, thus reducing flood damages on the lake, and increasing the beneficial use of the lake as a recreation activity.

Thus, the Conesus Lake control structure will be operated to reduce flooding on the lake while normally, a reservoir is operated to reduce flooding downstream from the dam. It is important to realize that the channel improvements to Conesus outlet are part of the control structure and were not designed as a flood control improvement for properties along the outlet.

The operation of the Conesus Lake control structure will be a very simple process. Sometime toward the end of October, the operator of the structure will open the gates to begin the winter drawdown to 816.5. Depending upon the inflows, it will take one-half month to a month to get down to the winter level of 816.5 feet (NGVD). The gates will remain wide open until February, when the operator will start to close the gates to bring the lake level to 819 feet (NGVD) by mid-March. The rate of change for closure of the gates will be determined for the Operation and Maintenance Manual. The rate the gates will be closed will be a function of observed snow pack, beginning level of the winter pool, and the rate the lake elevation is increasing. A good estimate is that during the months of February through April, the gate settings will be adjusted once a week.

Once the summer level of 819 feet (NGVD) is reached, the operator will begin to adjust the gates to insure that the 819 level is maintained until the end of June, when the lake should be drawn down to 818.5 for the rest of summer and early fall. It is during the summer months, when monthly inflows average between 20-30 cfs (down from 100-200 cfs during late winter and early spring), that the operator will have to use the most judgement in operating the control structure.

Presently, the New York State Department of Conservation (NYSDEC) requires 10 cfs to be maintained in the outlet. The operation scheme for the new control structure calls for the same 10 cfs to be maintained. As part of the Operation and Maintenance Manual for Conesus Lake, the Buffalo District will develop low flow rating curves to be used as an aid for maintaining 10 cfs in the Conesus outlet.

During the summer months, aside from the fact that 10 cfs will be maintained in the outlet, the operator must watch for summertime storms, such as Tropical Storm Agnes. As a rule of thumb, it would be wise to leave the gate settings alone until the lake level becomes intolerable. If during the summer period, the lake drops below 817.5-818, the gates should be adjusted to release just the required 10 cfs until the lake comes back up to elevation 818.5-819 (NGVD). At this point, the gate should be opened to release

approximately 20-30 cfs. If the lake goes above 819.3, the gates should be opened all the way until the lake gets back down to elevation 818.5-819 (NGVD). This type of operation should be maintained from April through October.

Drawdown curves were developed for Conesus Lake. These curves for a constant inflow are used in calculating how long it will take to get the lake down to elevation 816.5 (NGVD) from elevation 819 (NGVD). Since the average monthly inflow to Conesus ranged from a low of 20 cfs in July to 200 cfs in March, evaluations were made of constant inflow ranging from 0 cfs to 200 cfs in increments of 20 cfs. For simplicity, only those drawdown curves representing inflows of 0, 40, 100, 160, and 200 cfs are provided as Figures A21 through A25. The drawdown curves are for existing and improved conditions.

As can be seen on Figures A21 through A25 for existing conditions, any inflows averaging greater than 40 cfs will not allow the lake to be drawn down to 816.5. In fact, for a constant inflow of 40 cfs, it will take more than 100 days to reach elevation 816.5 (NGVD). For improved conditions, drawdown times ranged from 13 days (inflow = 0 cfs) to 30 days (inflow = 200 cfs), a marked improvement from the operational ranges available under existing conditions.

Sedimentation at the mouth of Conesus Lake might become the control for releases from the lake during low-flow periods. To insure that this sandbar across the outlet does not become the control, it should be inspected to make sure it does not get above 815.6. At present, this is not a problem, but the possibility of this becoming a problem will be investigated for the Operation and Maintenance Manual.

Presently, the NYSDEC has the responsibility for providing local cooperation. The NYSDEC has not decided who will be the local operator of the control structure. It is possible that some local agency, such as the Conesus Lake Association, the town of Livonia, or Livingston County, will be the local operator.

A1.12 FLOOD PROTECTION

A project is recommended that provides a 4.0 percent chance or 25-year degree of protection. This decision was reached based on an evaluation following ER-1105-2-111 "Flood Damage Prevention: Level of Protection for Urban Areas." Elements evaluated included possible loss of life, flood impacts, desires of local flood interests, economic, environmental, social considerations and other factors such as design considerations. Detailed rationale for not selecting a higher-degree of protection and the degree selected follows. Of principle importance are the conclusions that flooding would not be worse with the project and that a potential catastropghic situation is not created.

Plans providing higher degrees of protection were found to be uneconomically justified and unresponsive to social and environmental planning objectives as described in the Main Report section titled "Alternatives Eliminated

During Stage II." In general, residual average annual damages of $4,400 (Appendix B, Table B29) would not be sufficient to support the cost associated with higher levels of protection. Considerably greater structural work would be needed which would result in significant relocation of residences near the outlet channel and total destruction of the wetland near Route 256 in the outlet channel.

The potential for loss of life is considered non-catastrophic as there are no velocities associated with the stillwater lake levels around the lake. During the occurrence of say the SPF, residents would, therefore, have easy and unencumbered egress to higher ground away from the lake around the entire lake perimeter. They have this ability with or without the project.

Flood damages are considered non-catastrophic. Even though damages for rarer floods are quite high, see Tables A3a and A3b they are less severe with, than without the project. These damages would not cripple activities in the area either. While structures and contents would be damaged to a large extent, the basic structure would remain intact as there would be no velocities associated with stillwater flood levels to jeopardize structural integrity. With the basic structure intact, owner re-occupancy would occur more rapidly with than without the project.

Eleven 6-foot gates for the control structure were selected as they are the largest "off the shelf' gates available and were considered to be more economical than larger "made to order" gates. All gates will be manually operated with a gear reduction crank, see Appendix D, paragraph D4. A schedule of operation and maintenance tests will be included in the O&M manual to insure to the maximum extent possible gate operational availability. Even following a rigorous testing and inspection policy, the gates could stick. The probability of sticking is greatest in the winter. However, as the operation policy calls for all gates to remain open from 1 November through the end of January, Figure A15, a gate stuck open would not affect project functionality. After January 31, the operation policy calls for the closing of gates, dependent upon spring runoff, to bring the lake level up to elevation 819.0 for spring fish spawning. A gate stuck open would only hinder, minutely, functionality as the condition would quickly be recognized and corrected. During summer conservation periods all gates would be closed except one gate to release water for minimum stream flow requirements. If gates are stuck closed and a summer flood occurs, the affect would be worse than preproject conditions. This is due to the fact that the crest of the gates would be at elevation 820.0, see Plate D5, which is a full foot higher than the crest of the existing gates (see Plate A3). To circumvent this, the proposed 6x6 foot gates will be replaced with 6-foot wide by 5-foot high gates during the value engineer and plans and specification stages of study. The affect of gate opening failure would then be less than preproject conditions.

Stability analyses, presented in Appendix D revealed that the control structure would be stable for all floods up to and including the Probable Maximum Flood. A control structure failure analysis, discussed in Paragraph A1.10, revealed a peak outflow during possible failure of only 525 cfs which is well within the improved channel capacity. Flood levels on the lake would

be reduced for all floods up to and including the PMF. Although peak outflow discharges for the more frequent floods would increase with the project in place (see Figure A17), there is no development between Conesus Lake and Avon, NY, along the outlet which would be affected except in the area upstream from Rt. 256. The increase in channel capacity in this area with the proposed channelization negates the affects due to the increased discharges. For rarer floods, up to and including the PMF, Peak discharges would be reduced (see Paragraph A1.9).

A specific item of local cooperation will be recommended that will reduce the potential for enhancement on the project and Conesus Lake Outlet from the lake to the Genesee River to reduce the potential for increased residual damages due to future development. This item is as follows:

a. Enact and enforce flood plain management regulations, meeting the standards established by the Federal Emergency Management Agency for the National Flood Insurance Program under the National Flood Insurance Act of 1968 and the Flood Disaster Act of 1973.

Based upon all the factors above, flooding is not made worse and a potential catastrophic situation is not created by the project which is considered suitable justification for not selecting higher degrees of protection. Rationale for the degree selected follows.

In the strict sense, the degree of protection is based upon the frequency at which the zero damage elevation is exceeded. For the selected plan, this frequency from Figure A18 is 6.0 percent or 16-year. In the actual sense, other factors such as depth of flooding and residual damages were considered. Table A3a lists the elevation and depth of flooding and damage for selected frequency floods under without project conditions. Table A3b lists corresponding data for with project conditions.

Table A3a - Elevation and Depth of Flooding and Damages for Selected Frequency Floods Under Without Project Conditions

Flood Return Interval	Frequency in Percent	Elevation of Flood in Feet (1)	Depth of Flood in Feet (1)	Damages Without Project in Dollars (2)
16-Year	6.0	822.1	2.7	450,000
25-Year	4.0	822.3	2.9	540,000
50-Year	2.0	822.6	3.2	670,000
100-Year	1.0	822.9	3.5	840,000
SPF	No Frequency Assignable	829.4	10.0	3,400,000 $\pm$(3)
PMF	No Frequency Assignable	837.0	17.6	4,000,000 $\pm$(3)

(1) From Figure A18 for BOC. Zero Damage = 819.4.

(2) From Figure A32.

(3) Estimated from extrapolation of Figure A32.

Table A3[illegible] - Elevation and Depth of Flooding and Damages for Selected Frequency Floods Under With Project Conditions

Flood Return Interval	Frequency in Percent	Elevation of Flood in Feet (1)	Depth of Flood in Feet (1)	Damages Without: Damages With Project in Dollars (2)
16-Year	6.0	819.4	0	0
25-Year	4.0	819.6	0.2	3,000
50-Year	2.0	820.1	0.7	21,000
100-Year	1.0	820.7	1.3	80,000
SPF	No Frequency Assignable	82[illegible].2	7.8	3,000,000 ±(3)
PMF	No Frequency Assignable	83[illegible].0	15.6	3,900,000 ±(3)

(1) From Figure A18 for 30-60 Plan. Zero Damage = 819.4

(2) From Figure A32.

(3) Estimated from extrapolation of Figure A32.

Examination of damage survey data revealed that the $3,000 residual damages for the 4.0 percent chance (25-year) flood is restricted to landscaping dock, breakwall, etc., damages. No units would experience basement or first floor flooding. For the 2.0 percent chance (50-year) flood seven units would experience minor basement flooding. For the 1.0 percent chance (100-year) flood 50 units would experience basement and outside flooding to various degrees. Again, no units would experience first floor flooding.

Based upon the above and Tables A3a and A3b, a strong case could be made to claim a higher than 4.0 percent chance (25-year) flood degree of protection. However, an accompanying false sense of security might result. Accordingly, only a 4.0 percent chance flood degree of protection is claimed.

SECTION A2 - HYDRAULIC DESIGN

A2.1 GENERAL

Hydraulic analysis of Conesus Creek was completed from the Triphammer Road bridge upstream to Conesus Lake, about 11,500 feet. Flooding on Conesus Creek is caused by the inadequate capacity of the creek, the Route 256 bridge (Millville Dam), the Route 20A bridge, and the private road bridge and the inefficiency of the existing control structure. The major damage area is upstream of the Route 20A bridge and around Conesus Lake. The project area has one damage reach. Its index point is located at the north end of Conesus Lake. Structural improvements considered for flood damage reduction consist of channelization, a new diversion channel, and a new control structure. The existing control structure is removed.

A2.2 WATER SURFACE PROFILES - EXISTING CONDITIONS

Water surface profiles on Conesus Creek under existing conditions from Triphammer Road bridge upstream to Conesus Lake were computed. Backwater computations were performed using computer program 723-X6-L202A, HEC-2, "Water Surface Profiles," developed by the Hydrologic Engineering Center in Davis, CA. Backwater computations were performed for discharges ranging from 150 cfs to 6,000 cfs. Buffalo District office personnel during a field trip determined the Manning's "n" values under existing conditions. Manning's "n" values for the channel areas varied from 0.030 to 0.040. For overbank areas in the reach, "n" values varied from 0.050 to 0.070. Roughness coefficients were varied according to channel conditions, brush in overbank areas, presence of roads, lawns, depth of flows, and other factors. Expansion and contraction coefficients of 0.4 and 0.2, respectively, were used in these computations. At the Route 256 Bridge, there are three 5-foot diameter corrugated metal pipes with plate coverings. During the backwater computations, it was assumed that the three pipes under this bridge are open. Figures A26, A27, A28, and A29 show a plan view of the study area and the flooded outlines for the selected outflow and the Standard Project Flood under existing conditions. Water surface profiles under existing conditions are shown on Figure A30 for a 2-year or low flow event (270 cfs), the selected lake outflow (560 cfs), and the Standard Project Flood (6,850 cfs).

A2.3 RATING CURVE FOR EXISTING CONDITIONS

A stage-discharge curve for existing conditions is required at the index point for use in determining the average annual damages. This stage-discharge relationship at the index point was derived from the computed water surface profiles for various discharges. The rating curve for existing conditions is shown on Figure A31.

A2.4 SELECTED LAKE OUTFLOW

Lake outflow for the considered plans of improvement was selected based on the target levels required in the lake and rule curves for the lake level management and involved some of the following considerations:

a. Provision of an adequate degree of protection for the type and degree of development in the flooded area;

b. Maintenance of maximum capacity available through the existing structures without extensive alterations or replacements;

c. Preservation of the natural environment where feasible;

d. Consistency with good flood plain management practices, particularly those associated with the National Flood Insurance Program. After the benefit-cost ratio for various levels of protection were investigated, a lake outflow of 1,000 cfs was selected for the considered plan of improvement. It is a coincidence that the lake outflow is closely related to the 100-year discharge. From the discharge-frequency curve, a discharge of 560 cfs under existing conditions is at the same frequency as the selected outflow of 1,000 cfs under improved conditions.

A2.5 CHANNEL DESIGN

Channel grades for the alternatives were established from backwater computations and channel velocities. Manning's roughness and energy loss coefficients used in the backwater computations are given in paragraph A2.2. Channel alignments were selected based on topographical maps, field inspection, maximum land utilization, and least disruption to environment. Channel sections were designed with a trapezoidal cross section having side slopes 1 vertical on 3 horizontal.

A2.6 PLANS OF IMPROVEMENT

Several different plans of improvement were considered for the flood control measures on Conesus Creek. These plans were designed to provide different degrees of protection. The details of the best plan considered are presented in the next paragraph.

The selected plan of improvement consists of channelization, a new control structure, and a new diversion channel. This plan includes a new 35-foot wide trapezoidal earth channel with 1V on 3H side slopes, which will be constructed along the alignment of the existing channel from a point 3,060 feet upstream of the Route 256 bridge (Station 50+70) to a point 60 feet downstream of the Route 20A bridge (Station 104+40). The 35-foot wide channel has a length of 5,370 feet. At Station 106+40, there will be 11 slide gates with a 66-foot clear opening. The crest of the new control structure is at elevation 814.0. The old control structure will be removed. Between the Route 20A bridge and the gated structure will be a 65-foot wide trapezoidal channel. Riprap will be placed in this channel area. A new 60-foot wide trapezoidal earth channel with 1V on 3H side slopes would be constructed

from upstream of the control structure (Station 107+00) to Station 111+00. From Station 111+50 to Station 115+00 at the lake, there will be a new 25-foot wide earth diversion channel, which has 1V on 3H side slopes. In addition, discharges will continue to flow past the private road bridge through the existing channel. Average channel velocities vary from 0.6 fps to 4.3 fps. A velocity profile is shown on Plates D1 through D5.

The distribution of flow between the diversion channel and the existing channel is shown on Table A4.

Table A4 - Flows in Diversion Channel and Existing Channel

Q-Old Channel	Q-New Diversion	Q-Total
210 cfs	190 cfs	400 cfs
470 cfs	530 cfs	1,000 cfs
740 cfs	1,260 cfs	2,000 cfs

Although all of the improvements are on Conesus Creek, all of the protection is for Conesus Lake.

A2.7 WATER SURFACE PROFILES - IMPROVED CONDITIONS

For improved conditions, Manning's "n" values for the new earthen channel area was assumed as 0.025. The "n" values for the overbank areas are the same as those used under existing conditions. Figures A26, A27, A28, and A29 show the flooded outlines for the selected outflow and the Standard Project Flood under improved conditions. Water surface profiles under improved conditions are shown on Figure A30 for a 2-year or low flow event (680 cfs), the selected lake outflow (1,000 cfs), and the Standard Project Flood (5,600 cfs).

A2.8 RATING CURVE FOR IMPROVED CONDITIONS

A rating curve under improved conditions was derived from backwater computations and is shown on Figure A31.

A2.9 DOWNSTREAM AREAS

In most cases with the plan of improvement, discharges less than 1,500 cfs are increased in the downstream areas. Discharges greater than 1,500 cfs are reduced in the downstream areas. Between the Route 20A bridge and the Genesee River, there are two possible damage areas. One was located between the N.Y. Route 256 bridge and the U.S. Route 20A bridge. The other area was located downstream of the Littleville Road dam in the town of Avon. In both areas, the backwater analysis indicated there was no significant damage. It was estimated that a discharge of 3300 cfs would cause damage in the area downstream of the Littleville Road dam.

A2.10 STANDARD PROJECT FLOOD

For the Standard Project Flood under improved conditions, the control structure would remain stable because of high tailwater conditions. With the gates open, the average channel velocity is approximately 4.5 feet per second.

SECTION A3 - FLOOD DAMAGES

A3.1 GENERAL

One of the major floods in the study area occurred during Hurricane Agnes in June 1972. Extensive flooding on Conesus Creek and Conesus Lake in 1972 intensified public concern regarding the need for flood protection. Based on a Conesus Lake level, it was estimated that the outflow on Conesus Creek during the June 1972 flood was 770 cfs. Peak lake elevation during the storm was 822.5.

A3.2 EXTENT OF FLOODING

Conesus Creek and Conesus Lake have historically experienced periodic flooding. The most significant flood damage along Conesus Creek is concentrated in the area upstream of the Route 20A bridge.

A3.3 CHARACTER OF THE FLOODED AREA

The character of the flooded area is residential with some seasonal cottages. However, many of the residences in this recreational area are becoming permanent.

A3.4 DESCRIPTION OF FLOOD REACH

The project area has one damage reach. This reach includes the area along the creek upstream of the Route 20A bridge and the entire area around Conesus Lake.

A3.5 DAMAGE SURVEY BY CORPS OF ENGINEERS

A detailed damage survey was conducted by the Buffalo District in March-April 1979. An index point, which shows the changes in water surface elevation and is representative of the entire reach, was selected. It was located at the north end of the lake. Present flood losses include damage to residential and commercial structures, utilities, and docking facilities. Flood fighting and cleanup costs are included too. The results of the 1979 field survey were used as the basis for determining average annual flood damages from estimated future flood occurrences and benefits that would result from the considered plan of improvement. All elevations are National Geodetic Vertical Datum (NGVD).

A3.6 METHOD OF ESTIMATING FLOOD DAMAGES

Residential - The value, type of structure, and first floor elevation of each affected unit was established from field inspection. The value of household contents was determined based on structural value. The estimates of structural and content value considered the location of each unit relative to the neighborhood in terms of proximity to commercial development, schools and churches, general appearances of the structure, and the nature and extent of landscaping and other improvements. Damages to boating and docking facilities were also considered. Damages were determined from a depth-percent

curve as shown on Table A5. All damages were relative to a first floor elevation. Each structure was divided into one of the following categories:

Type 1N = 1 Story No Basement
Type 2N = 2 Story No Basement
Type 1B = 1 Story With Basement
Type 2B = 2 Story With Basement
Type 3B = Split Level

Damages were estimated at various flood depths based on depth-percent damage relationships. The initial damage elevation was defined as the flood height at which water entered the unit's lowest opening. Damages to the units were based on cost of repair, the depreciated value, or cost to replacement. Under existing conditions, the number of houses that would be affected by various frequencies of flooding are shown below:

25-Year Flood - 400 Houses
50-Year Flood - 475 Houses
100-Year Flood - 510 Houses
Standard Project Flood - 940 Houses

The market value of all these properties is approximately $8,300,000 (March 1979 price levels).

Commercial - All commercial damage estimates are based on personal interviews and include estimated damages to machinery and inventory, lost wages, damage, and anticipated cleanup costs. During the interviews with owners and/or managers of commercial units, field personnel documented the overall condition of the building and equipment as well as the type and value of inventory. There are 11 commercial establishments susceptible to flooding.

Public and Other - The estimated damages to public facilities such as buildings, roads, bridges, and utilities were determined by calculated flood depths and field observations. Detour costs were based on traffic counts, variable costs of automobile and truck operations, and a cost of driver time for commercial truck operators. Emergency operations and cleanup cost incurred by local, State, and Federal agencies were estimated based upon physical characteristics of the flooding (e.g., flood depths and durations), the flood emergency activities of the affected area, and field observations.

A3.7 STAGE-DAMAGE CURVES

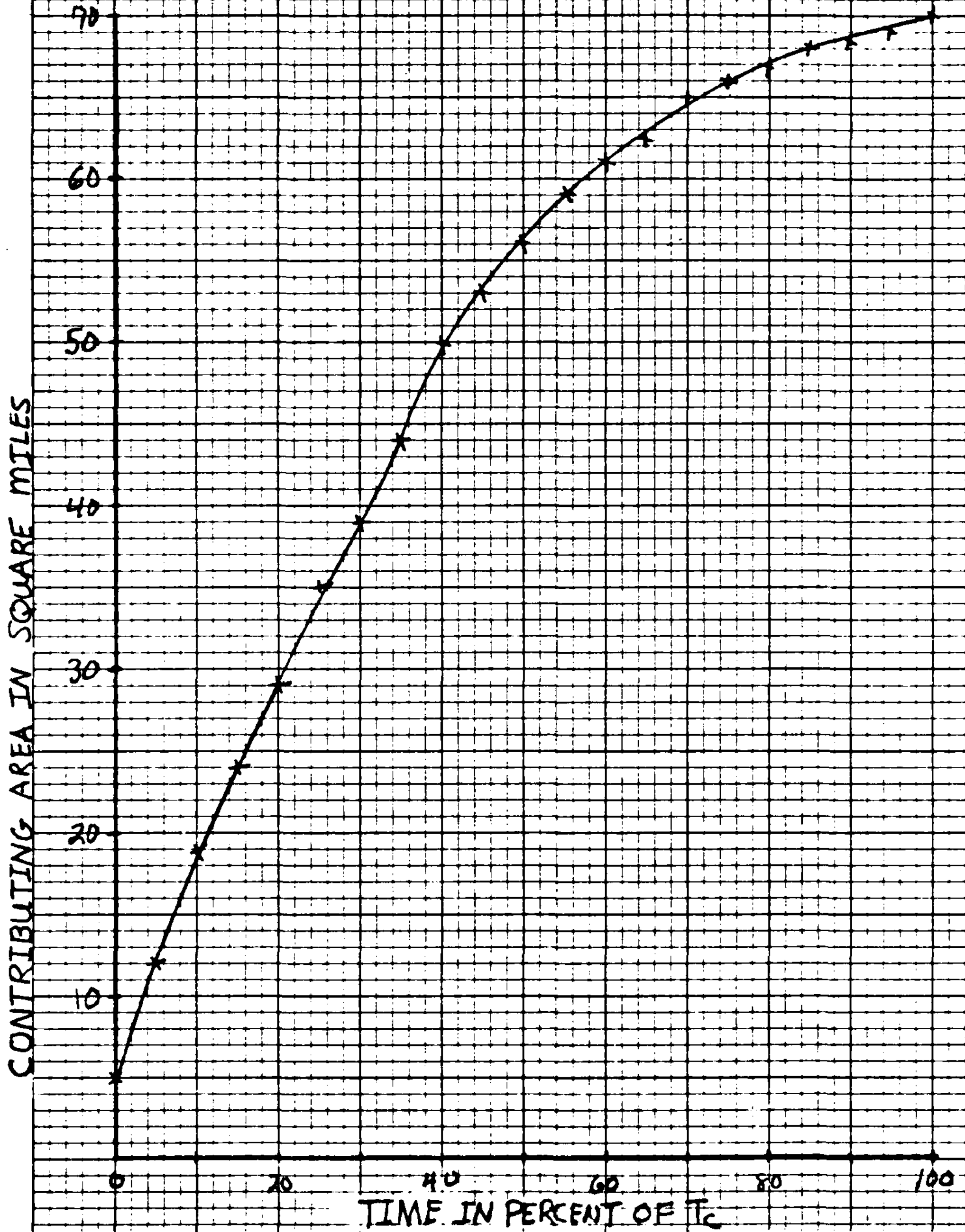
Flood stages and corresponding damages at various levels above and below the 1972 flood event were calculated and plotted at the index point. These points were used to develop stage-damage curves for the reach. The elevation of zero damage in the reach was established from data obtained from interviews and field observations. Zero damage at the Index Point is elevation 819.4. These stage-damage curves are shown on Figure A32.

Table A5 - Depth Percent Damage

Depth	Structural Damage in Percent 1N	2N	1B	2B	3B	Contents Damage in Percent 1N	2N	1B	2B	3B
-8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-7.6	0.0	0.0	0.8	0.4	0.4	0.0	0.0	2.0	1.2	0.5
-7.2	0.0	0.0	1.6	0.7	0.7	0.0	0.0	4.0	2.3	1.0
-6.8	0.0	0.0	2.3	0.9	0.9	0.0	0.0	5.9	3.3	1.4
-6.4	0.0	0.0	2.8	1.0	1.0	0.0	0.0	7.0	4.0	1.7
-6.0	0.0	0.0	3.4	1.2	1.2	0.0	0.0	8.3	4.7	1.9
-5.6	0.0	0.0	4.0	1.3	1.3	0.0	0.0	9.5	5.2	2.4
-5.2	0.0	0.0	4.5	1.5	1.5	0.0	0.0	10.4	5.7	2.9
-4.8	0.0	0.0	5.0	1.7	1.7	0.0	0.0	11.2	6.2	3.5
-4.4	0.0	0.0	5.3	1.8	1.8	0.0	0.0	12.0	6.6	4.2
-4.0	0.0	0.0	5.6	1.9	1.9	0.0	0.0	12.7	7.0	5.1
-3.6	0.0	0.0	5.8	2.0	2.0	0.0	0.0	13.2	7.4	6.0
-3.2	0.0	0.0	6.1	2.1	2.1	0.0	0.0	13.8	7.8	7.2
-2.8	0.0	0.0	6.3	2.2	2.9	0.0	0.0	14.2	8.2	8.3
-2.4	0.0	0.0	6.6	2.8	4.5	0.0	0.0	14.7	8.5	9.7
-2.0	0.0	0.0	6.8	3.3	6.1	0.0	0.0	15.0	8.8	11.0
-1.6	1.0	1.0	7.0	4.0	7.7	0.0	0.0	15.2	9.2	12.5
-1.2	1.8	1.8	7.3	4.7	9.2	0.0	0.0	16.2	9.5	14.1
-0.8	2.8	2.4	8.0	5.6	10.3	0.0	0.0	18.0	10.0	15.8
-0.4	4.0	3.4	9.0	6.9	11.9	0.0	0.0	20.4	11.8	17.4
0.0	5.8	4.6	10.0	8.0	13.7	7.0	5.5	23.7	13.5	19.2
0.4	8.2	6.0	12.8	9.4	15.5	21.0	11.5	27.7	15.6	21.1
0.8	11.3	7.8	15.6	10.7	17.5	32.5	16.7	32.3	18.0	23.2
1.2	15.2	9.5	18.1	12.0	21.0	42.0	21.2	38.0	20.7	25.6
1.6	19.1	11.8	20.2	15.0	23.0	49.5	25.3	43.8	24.1	28.0
2.0	23.0	14.5	22.3	17.0	26.0	56.0	29.0	49.6	28.2	30.7
2.4	26.3	17.5	23.7	20.0	29.5	61.0	32.5	55.0	32.0	33.1
2.8	29.1	20.3	25.1	23.0	33.5	66.0	35.5	59.3	35.6	35.6
3.2	32.5	22.8	27.5	26.5	38.0	69.7	38.5	62.9	38.8	98.2
3.6	35.5	25.3	33.0	30.0	45.0	72.5	41.2	65.7	41.7	41.0
4.0	38.2	27.5	39.0	35.0	52.0	75.2	43.7	68.0	44.5	43.9
4.4	43.0	31.5	47.0	40.0	65.0	77.3	46.2	70.0	47.0	46.8
4.8	47.5	35.5	57.5	45.5	71.0	79.2	48.5	71.6	49.3	49.5
5.2	52.5	41.0	67.5	53.0	76.0	80.8	51.2	73.3	52.0	52.5
5.6	57.5	48.0	72.0	61.0	80.0	82.3	54.2	75.6	54.9	55.4
6.0	66.0	58.0	78.0	70.0	82.5	83.8	57.3	77.9	57.9	58.3
6.4	75.0	67.0	82.5	77.0	85.5	85.3	60.3	80.2	60.8	61.2
6.8	79.0	75.0	85.5	82.0	88.5	86.8	63.3	82.5	63.8	64.1
7.2	84.0	81.0	88.5	86.0	91.0	88.3	66.4	84.7	66.7	67.0
7.6	88.0	86.0	91.5	90.0	93.0	89.8	69.4	87.0	69.7	69.9
8.0	92.0	90.5	94.0	93.0	95.0	91.3	72.4	89.3	72.6	72.8
8.4	95.0	94.5	96.5	96.0	97.0	92.8	75.5	91.6	75.6	75.7
8.8	98.0	98.0	98.5	98.5	99.0	94.3	78.5	93.9	78.5	78.6

A3.8 AVERAGE ANNUAL DAMAGES

For determining average annual damages, a stage-frequency curve at the index point was developed from the stage-discharge curve and discharge-frequency curve. Average annual damages under existing conditions is $113,400 (updated to March 1981 price levels).



K•E 5 X 5 TO 1/2 INCH • 7 X 10 INCHES KEUFFEL & ESSER CO MADE IN U.S.A.

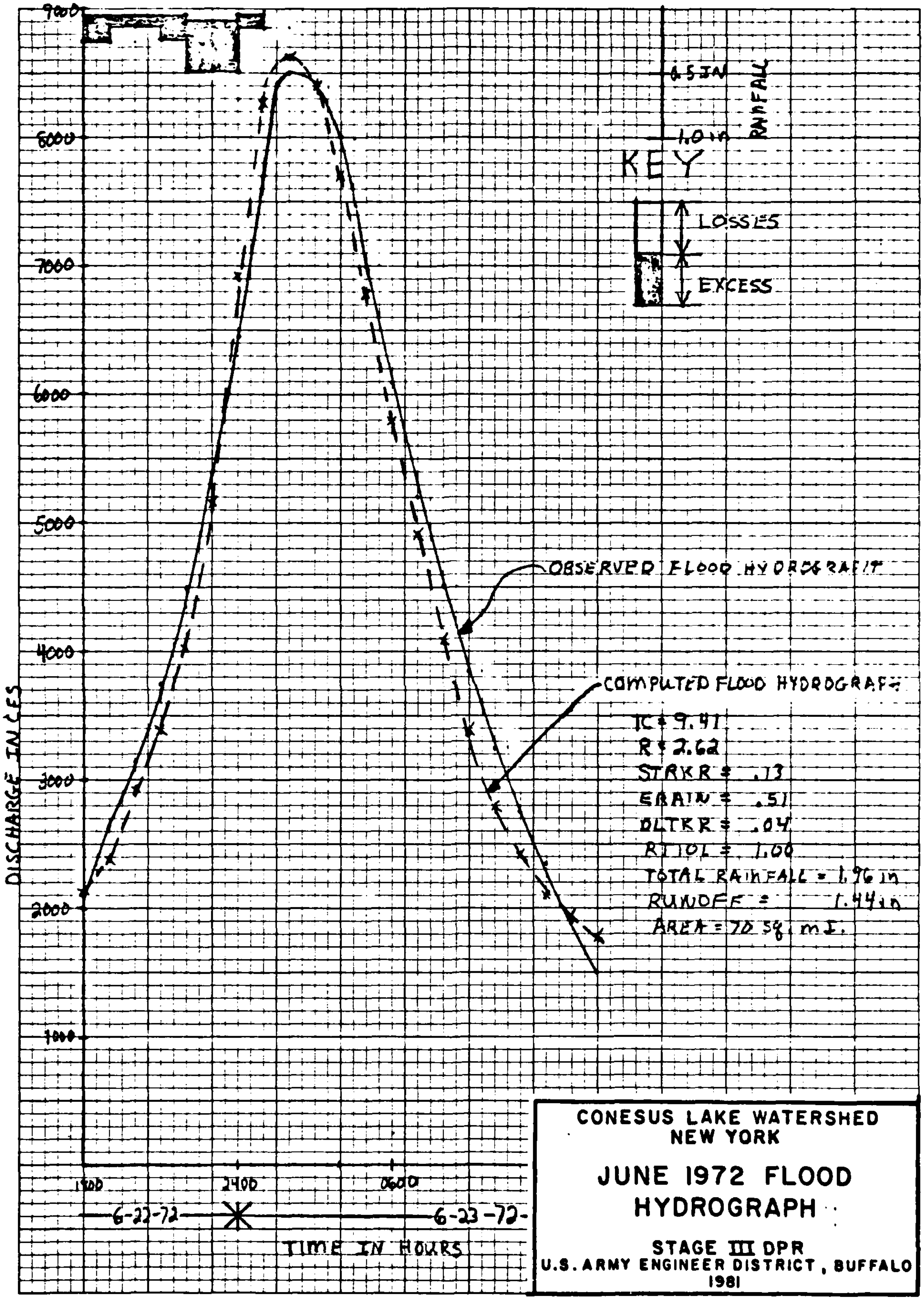
46 0860

CONESUS LAKE WATERSHED
NEW YORK

TIME - AREA CURVE

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE AI

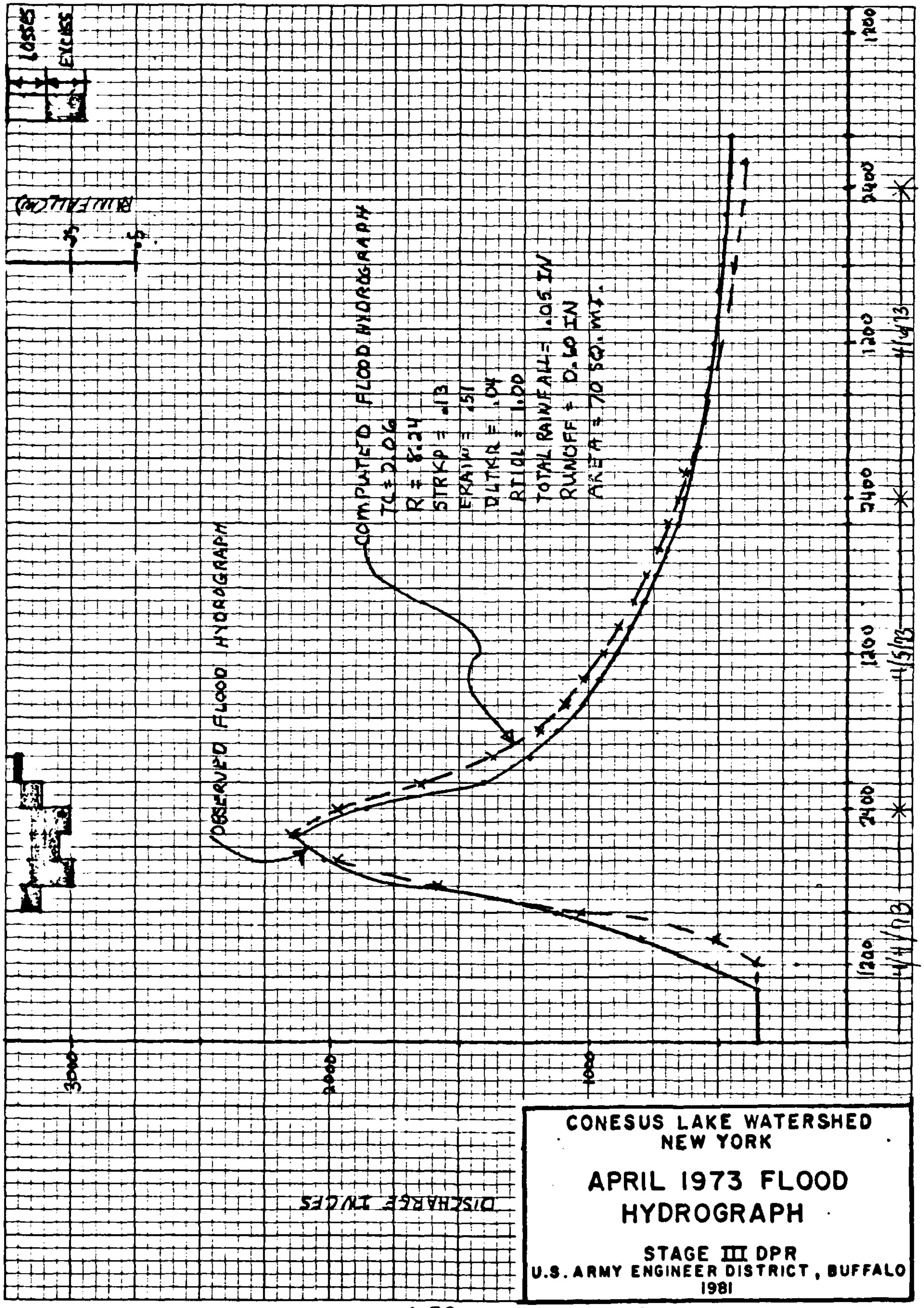


CONESUS LAKE WATERSHED
NEW YORK

JUNE 1972 FLOOD HYDROGRAPH

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A2



CONESUS LAKE WATERSHED
NEW YORK

APRIL 1973 FLOOD HYDROGRAPH

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A3

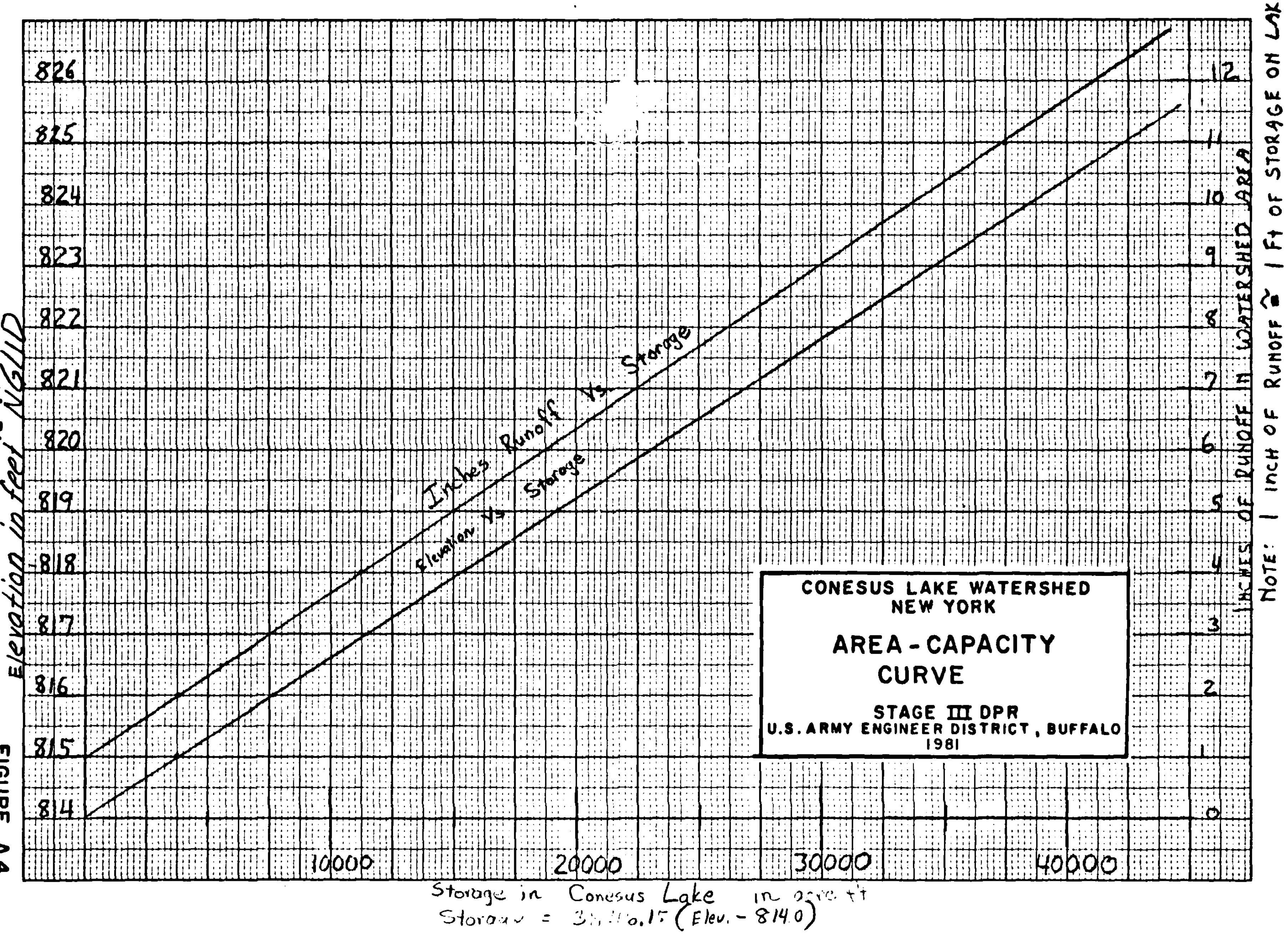
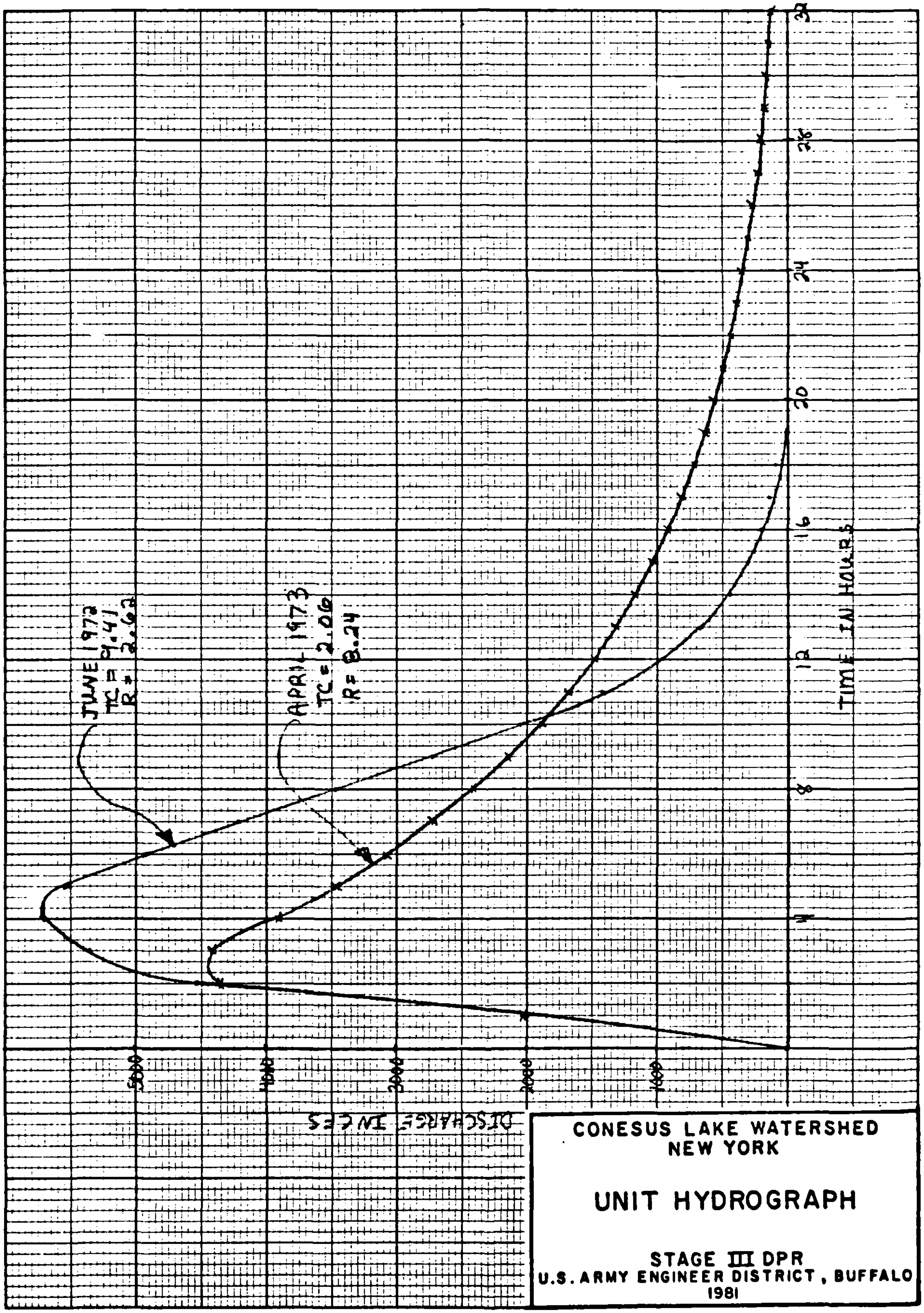

Elevation in feet NGVD
826
825
824
823
822
821
820
819
818
817
816
815
814
Inches Runoff Vs. Storage
Elevation Vs. Storage
CONESUS LAKE WATERSHED
NEW YORK
AREA - CAPACITY
CURVE
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981
10000
20000
30000
40000
Storage in Conesus Lake in acre ft
12
11
10
9
8
7
6
5
4
3
2
1
0
INCHES OF RUNOFF IN WATERSHED AREA
NOTE: 1 INCH OF RUNOFF ≅ 1 Ft OF STORAGE ON LAKE

FIGURE A4

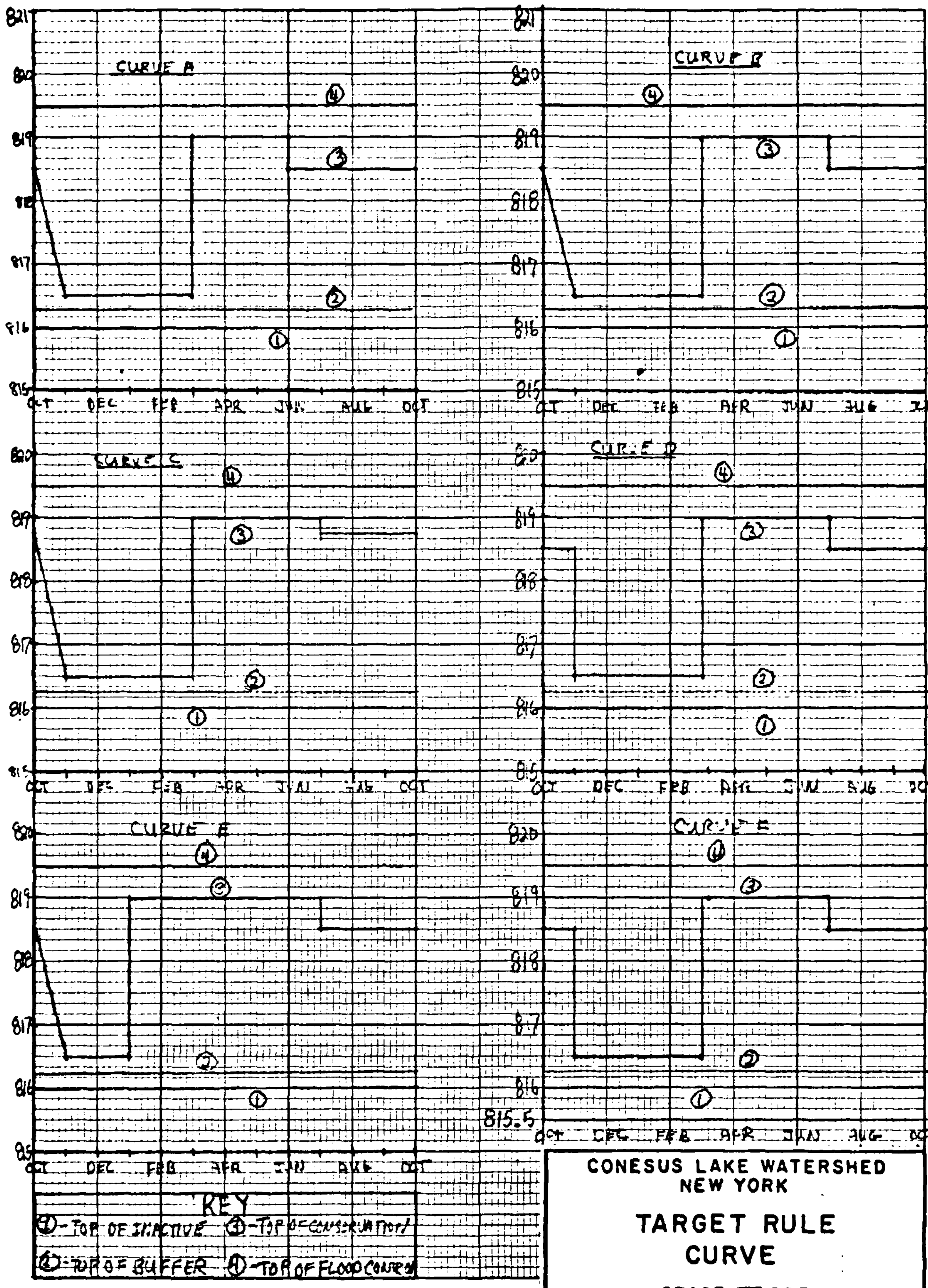


CONESUS LAKE WATERSHED
NEW YORK

UNIT HYDROGRAPH

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A5

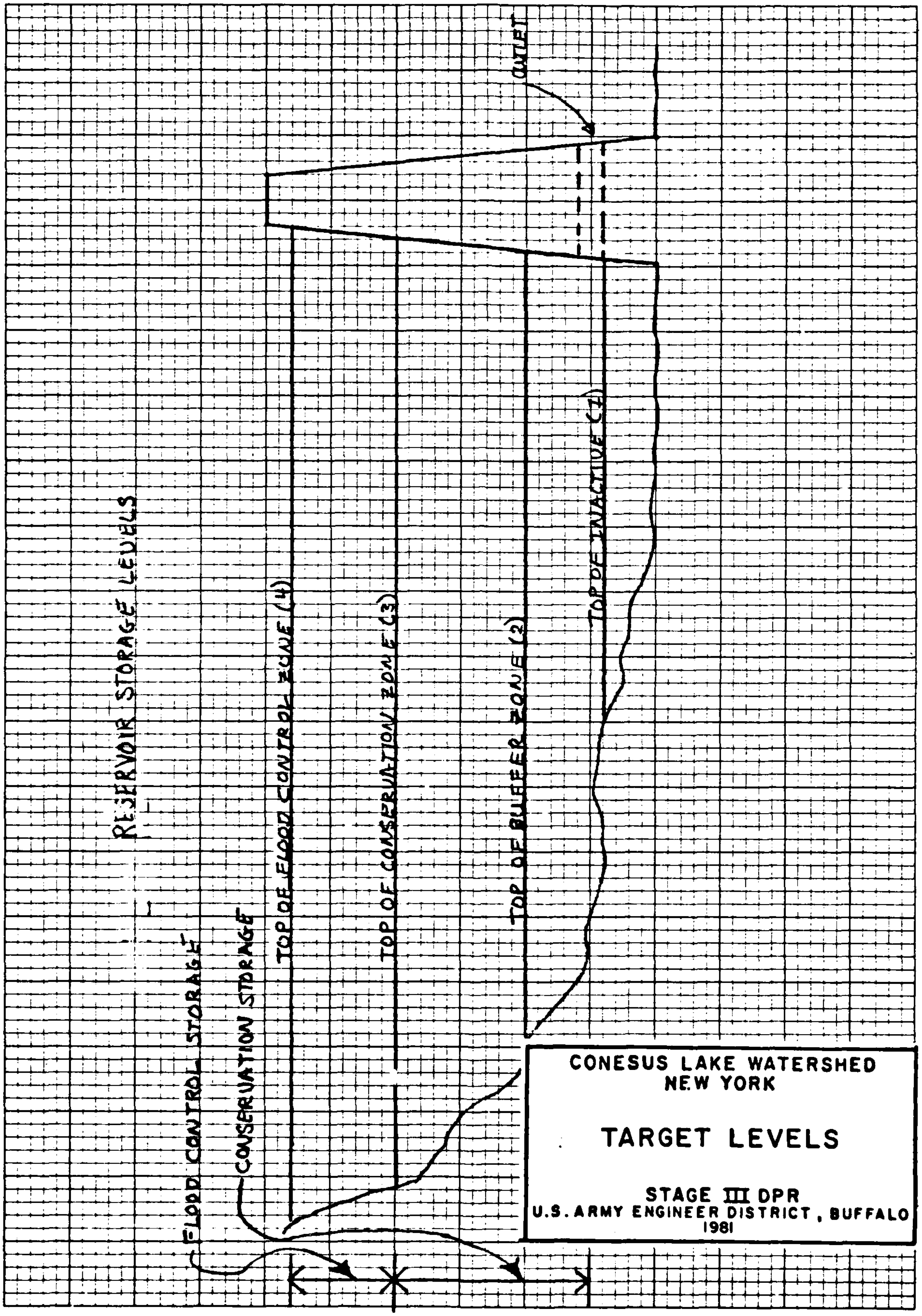


CONESUS LAKE WATERSHED
NEW YORK

TARGET RULE CURVE

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A6

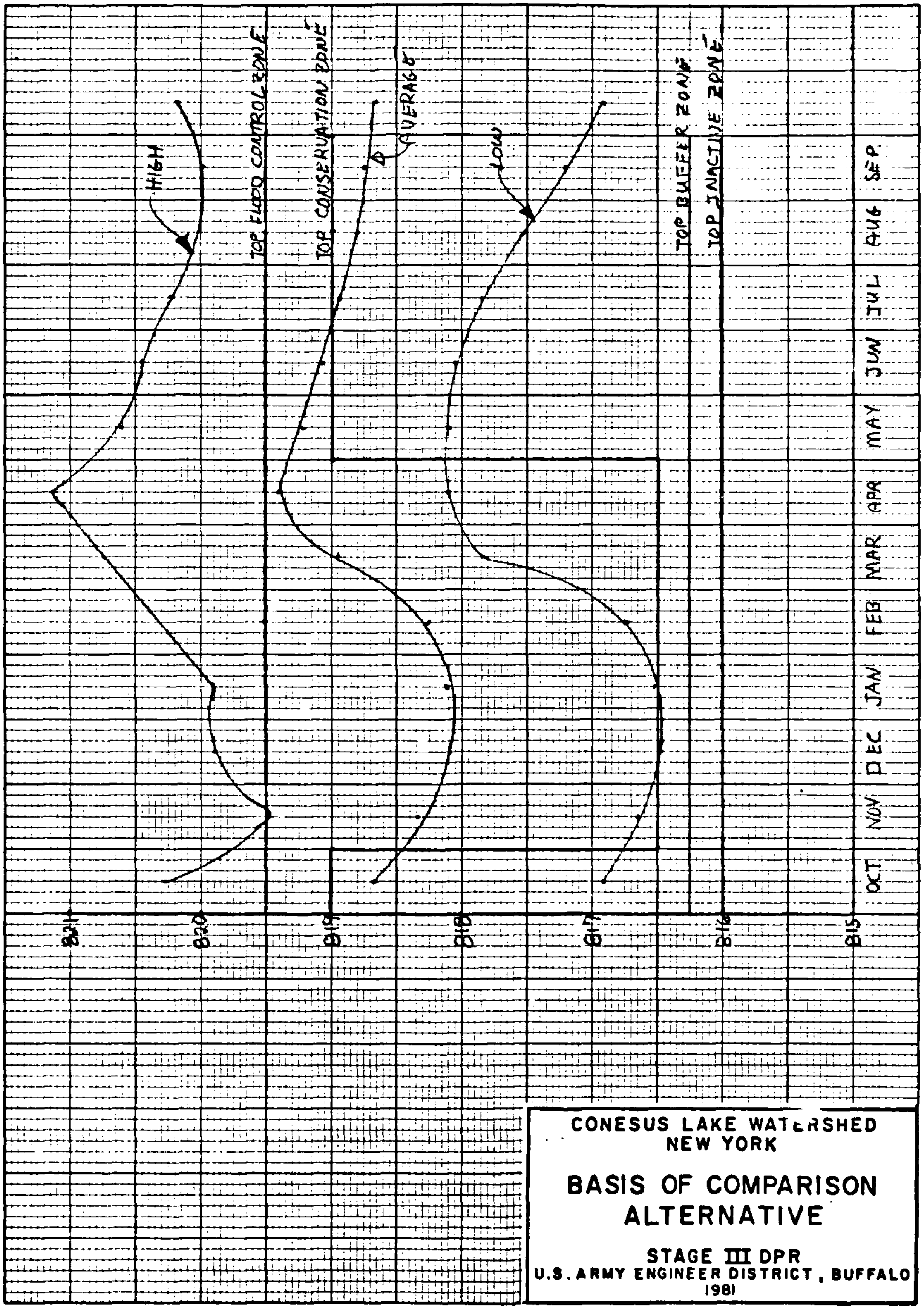


CONESUS LAKE WATERSHED
NEW YORK

TARGET LEVELS

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A7

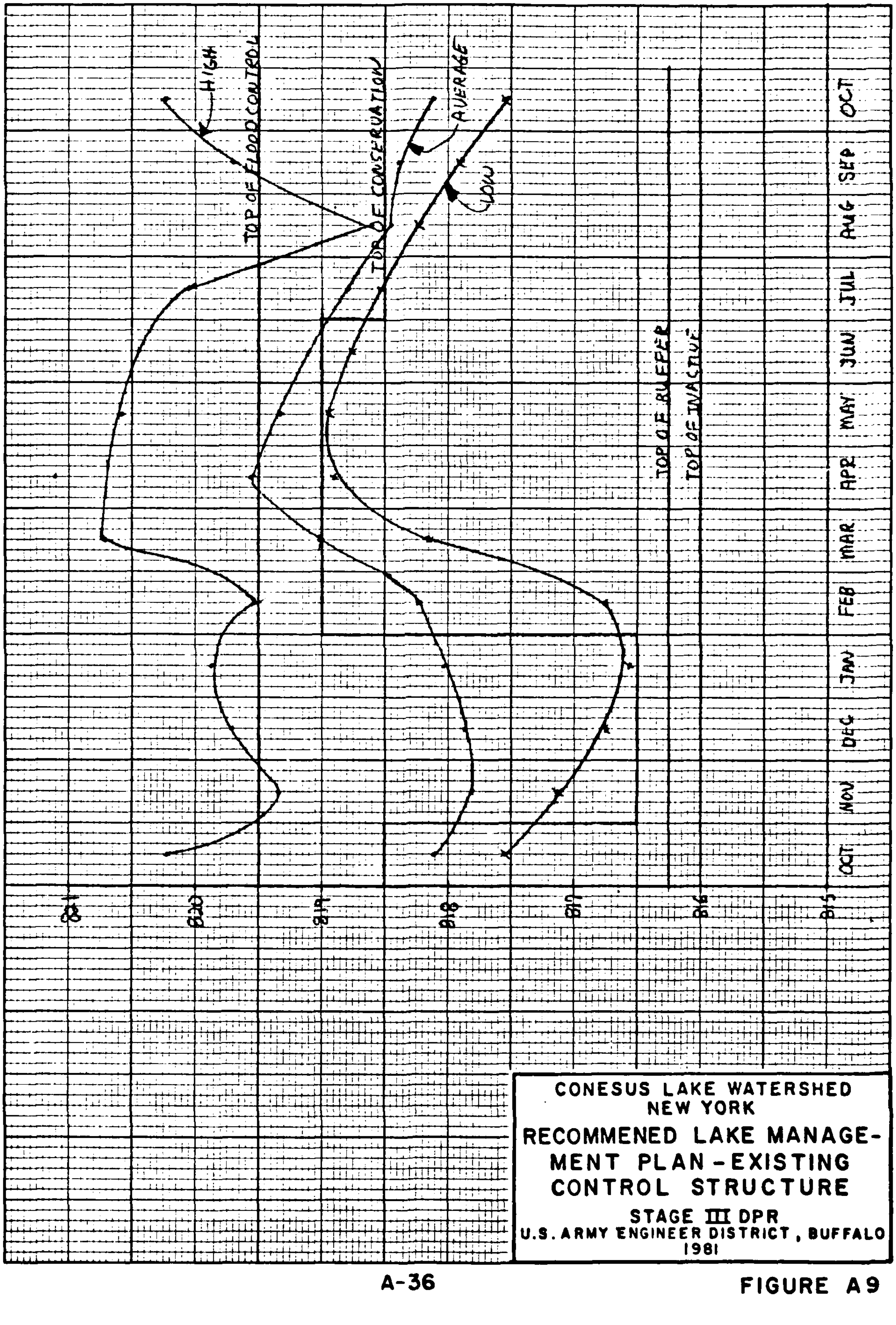


CONESUS LAKE WATERSHED
NEW YORK

BASIS OF COMPARISON ALTERNATIVE

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A8

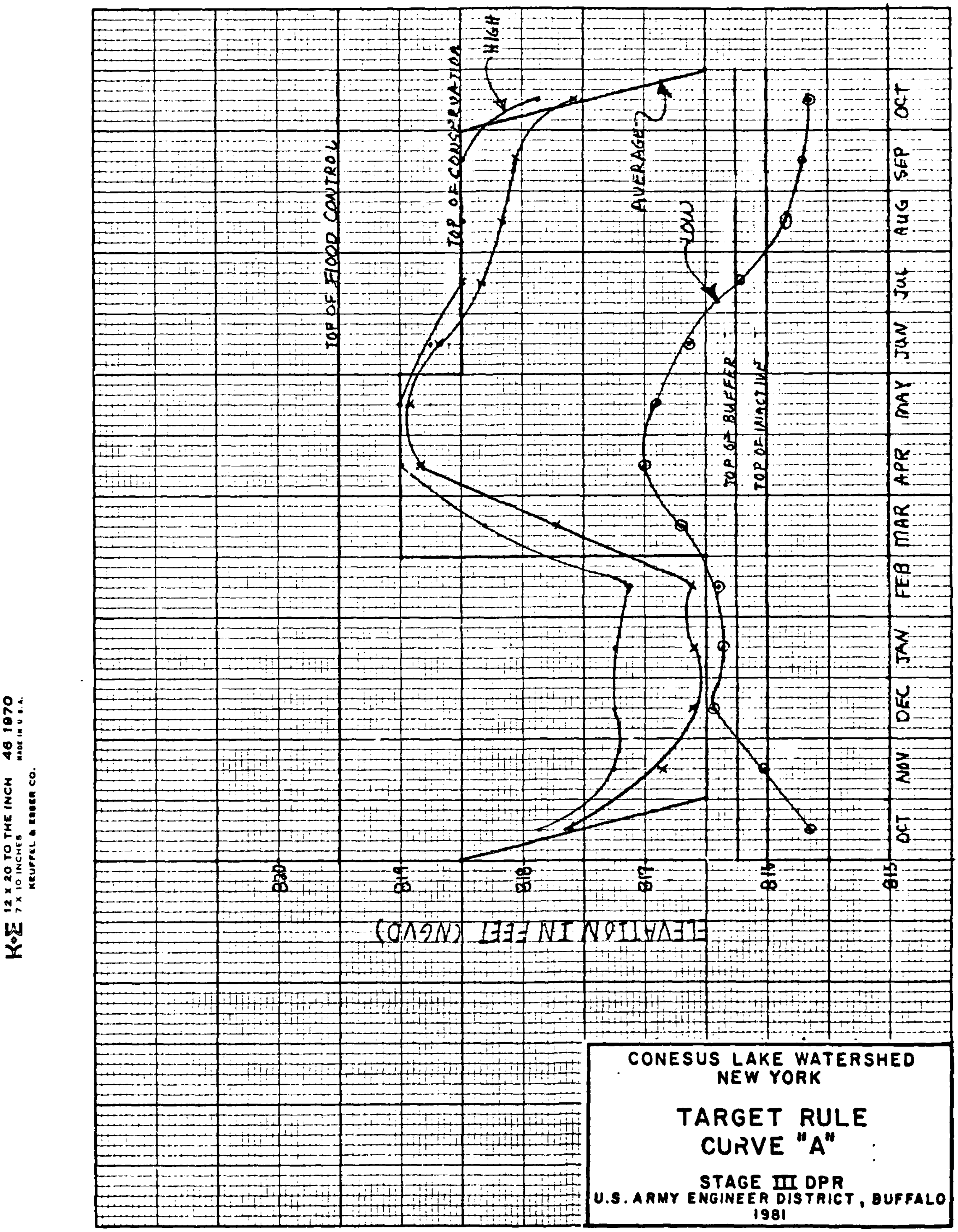


CONESUS LAKE WATERSHED
NEW YORK

RECOMMENED LAKE MANAGEMENT PLAN - EXISTING CONTROL STRUCTURE

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A9

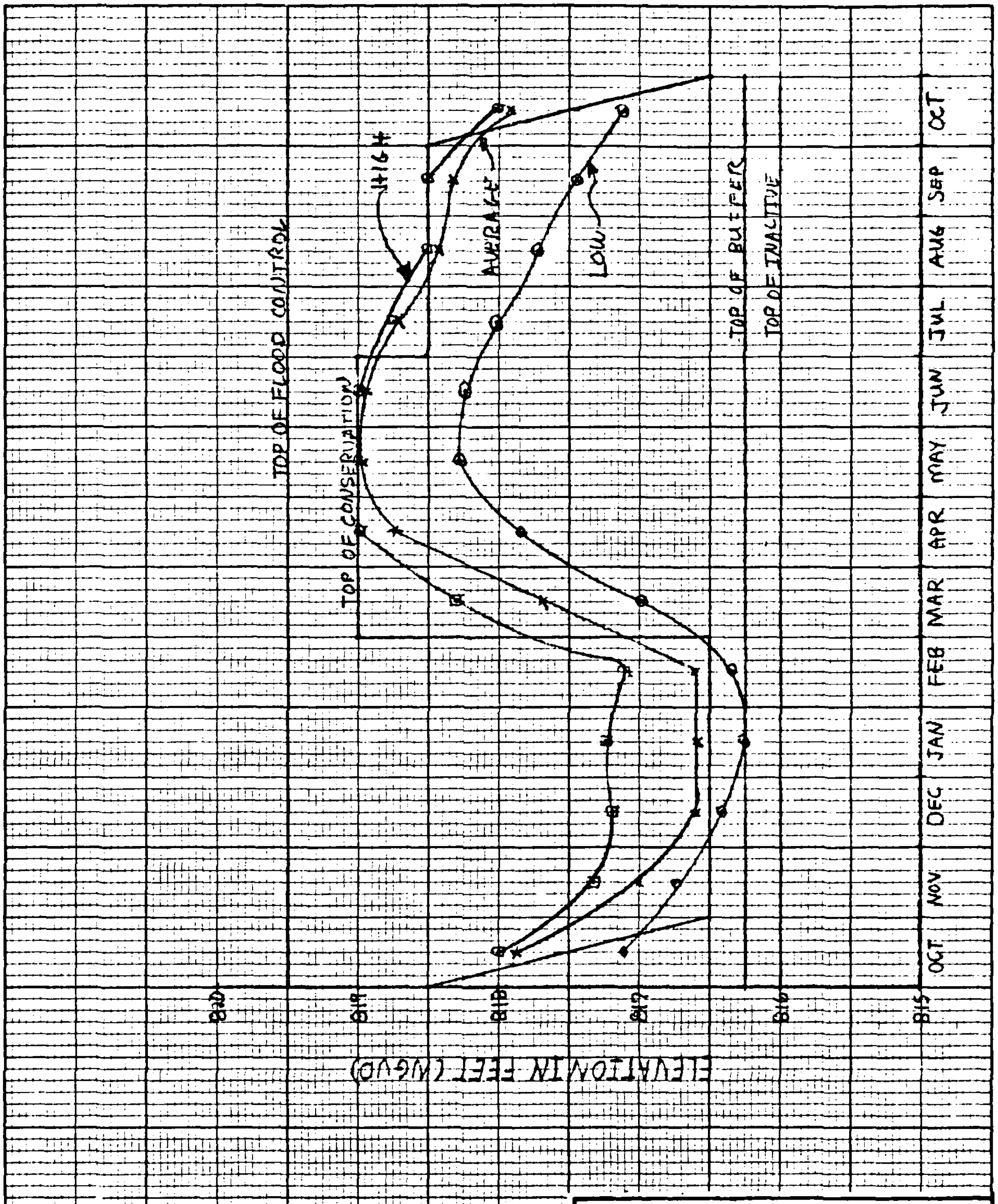


CONESUS LAKE WATERSHED
NEW YORK

TARGET RULE CURVE "A"

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A 10

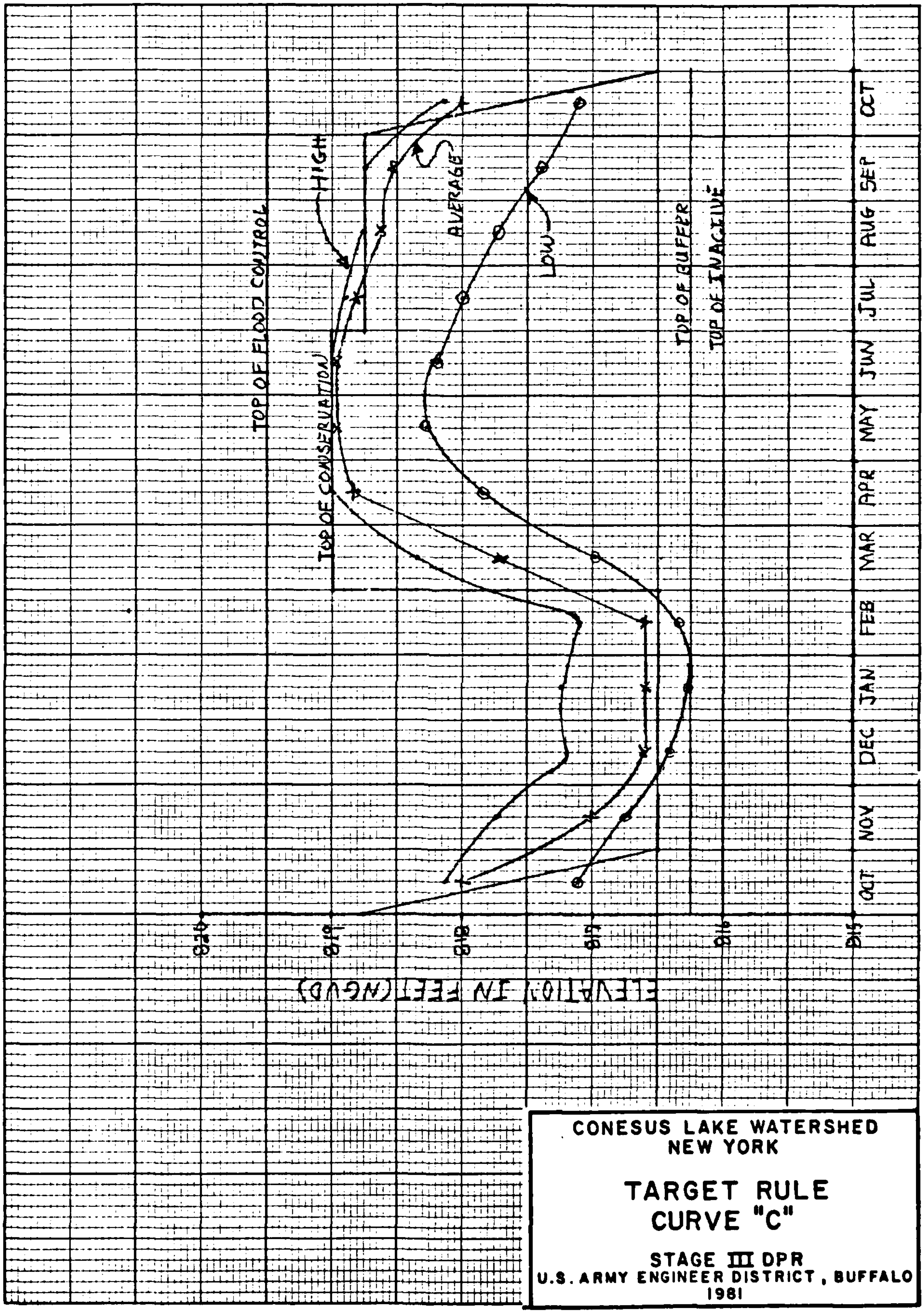


CONESUS LAKE WATERSHED
NEW YORK

TARGET RULE CURVE "B"

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A11

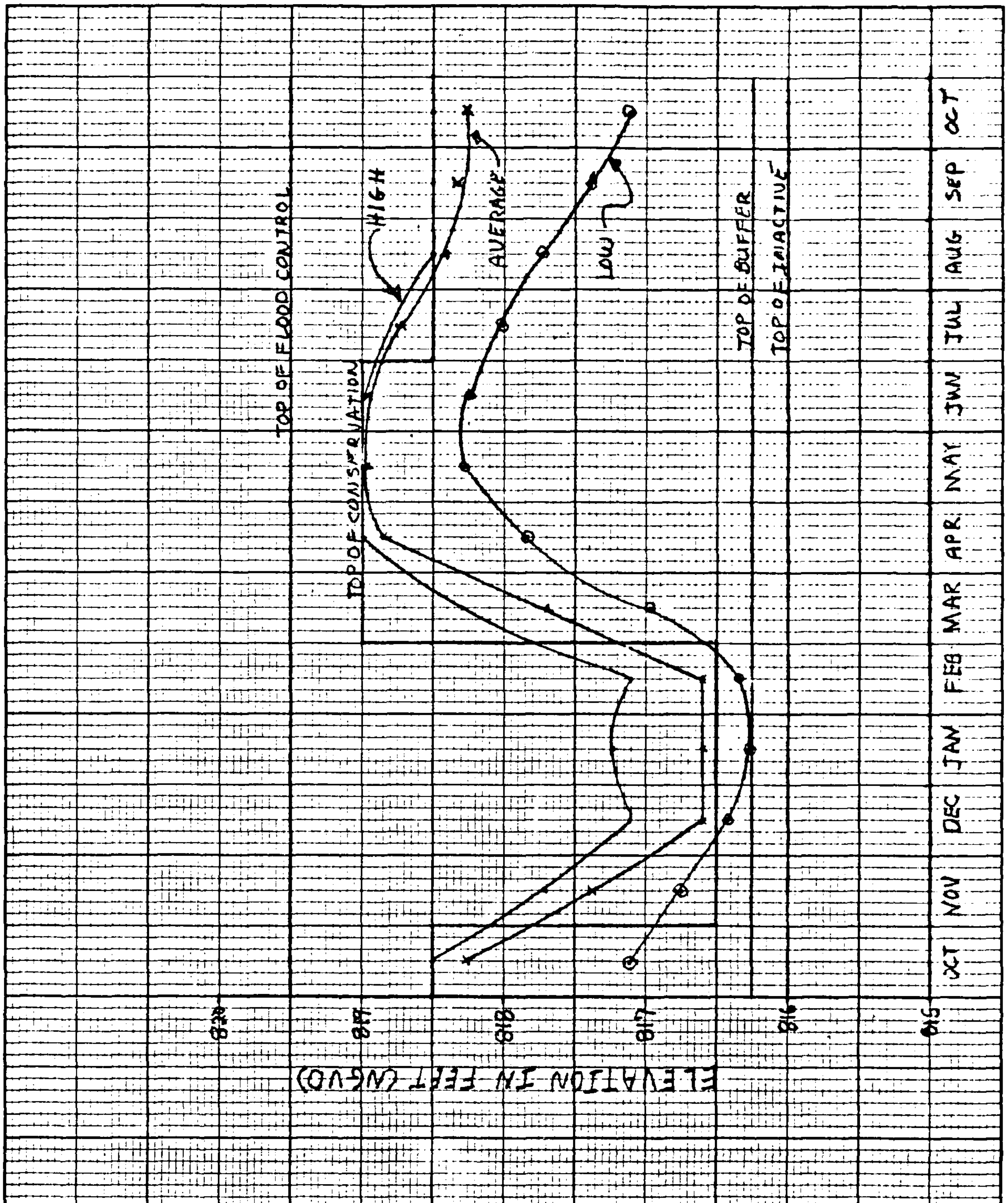


CONESUS LAKE WATERSHED
NEW YORK

TARGET RULE CURVE "C"

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A12

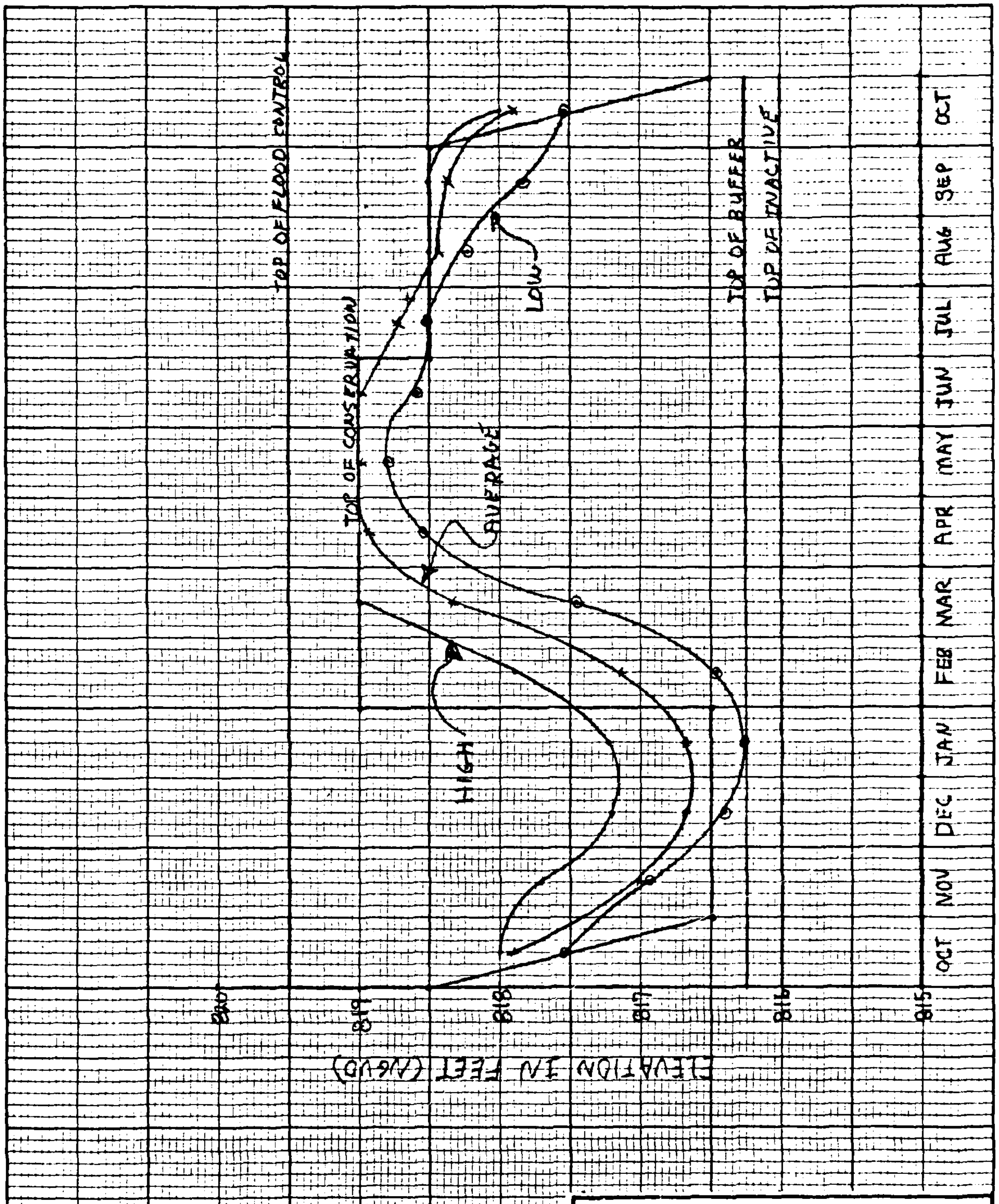


CONESUS LAKE WATERSHED
NEW YORK

TARGET RULE CURVE "D"

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A13

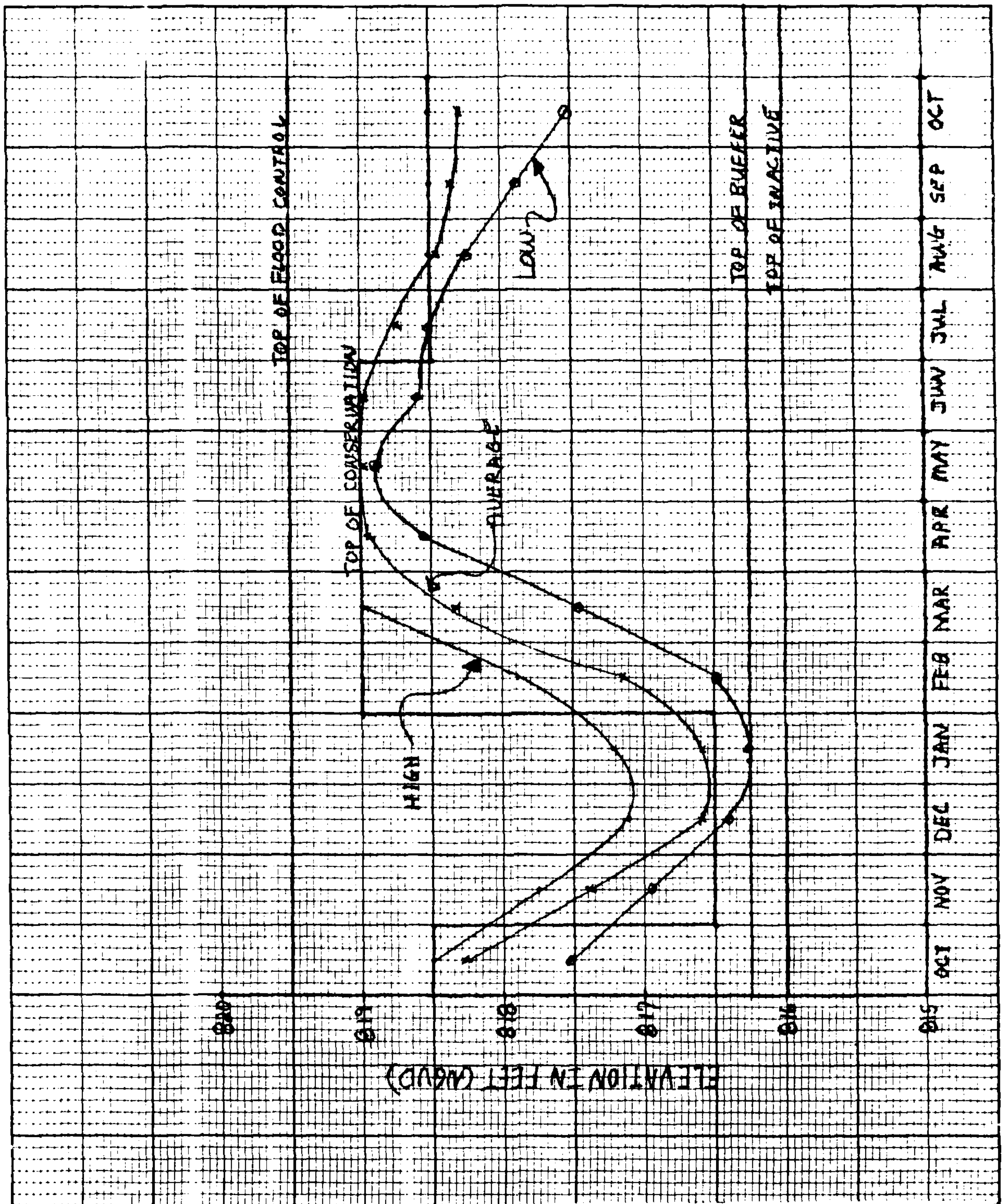


CONESUS LAKE WATERSHED
NEW YORK

**TARGET RULE
CURVE "E"**

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

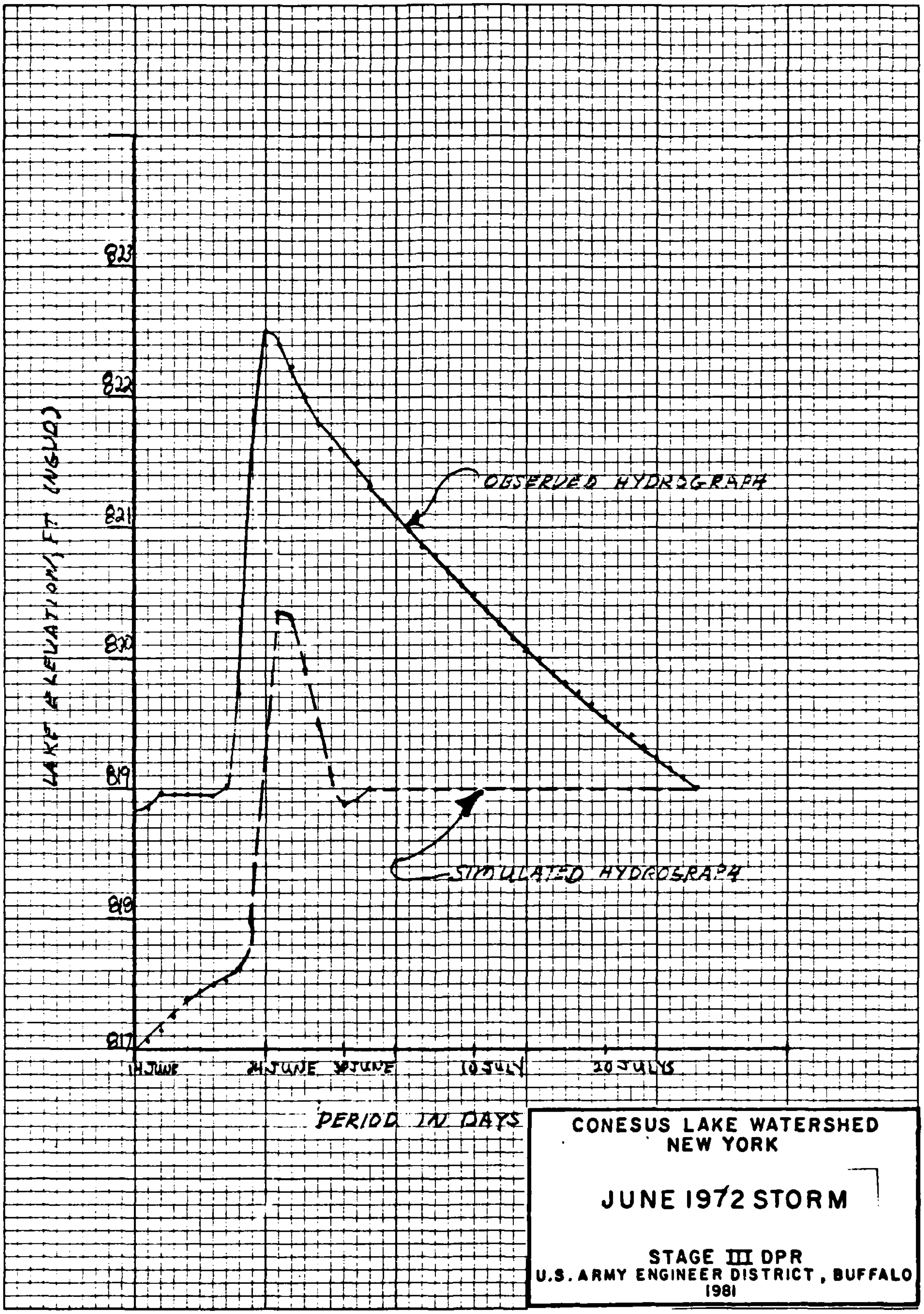
FIGURE A14



CONESUS LAKE WATERSHED
NEW YORK

TARGET RULE
CURVE "F"
(RECOMMENDED)
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A15

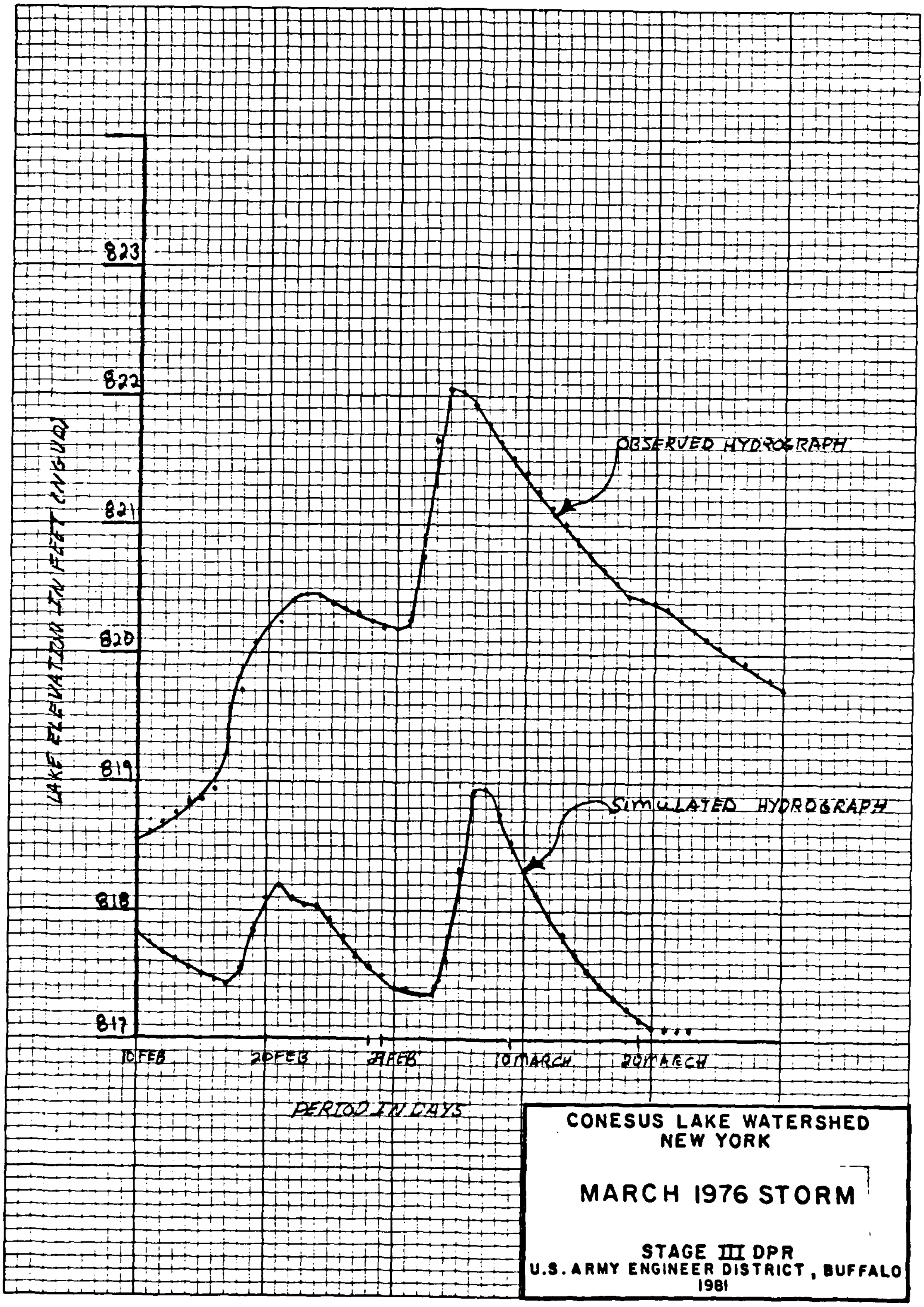


CONESUS LAKE WATERSHED
NEW YORK

JUNE 1972 STORM

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A16



CONESUS LAKE WATERSHED
NEW YORK

MARCH 1976 STORM

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A17

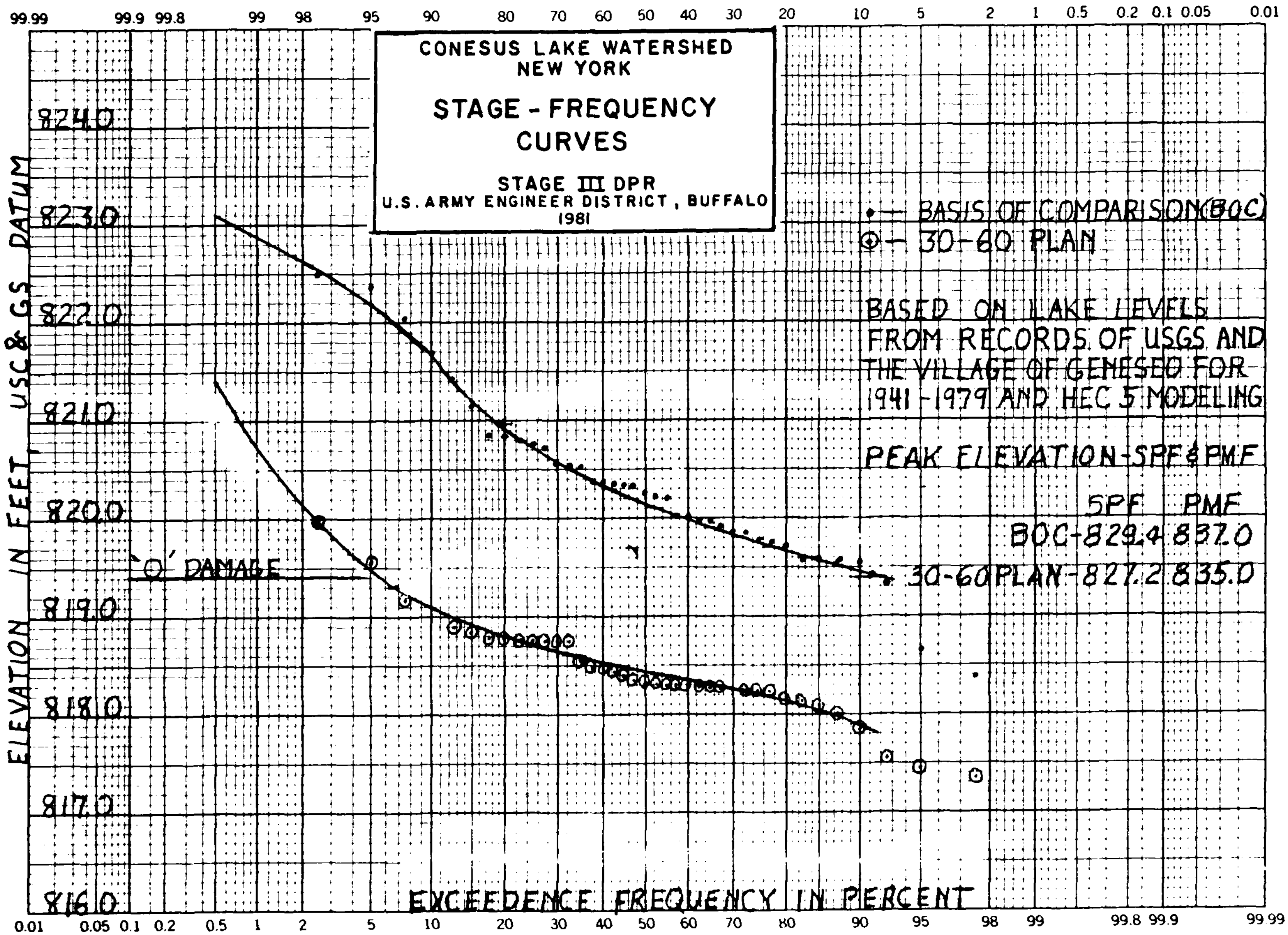
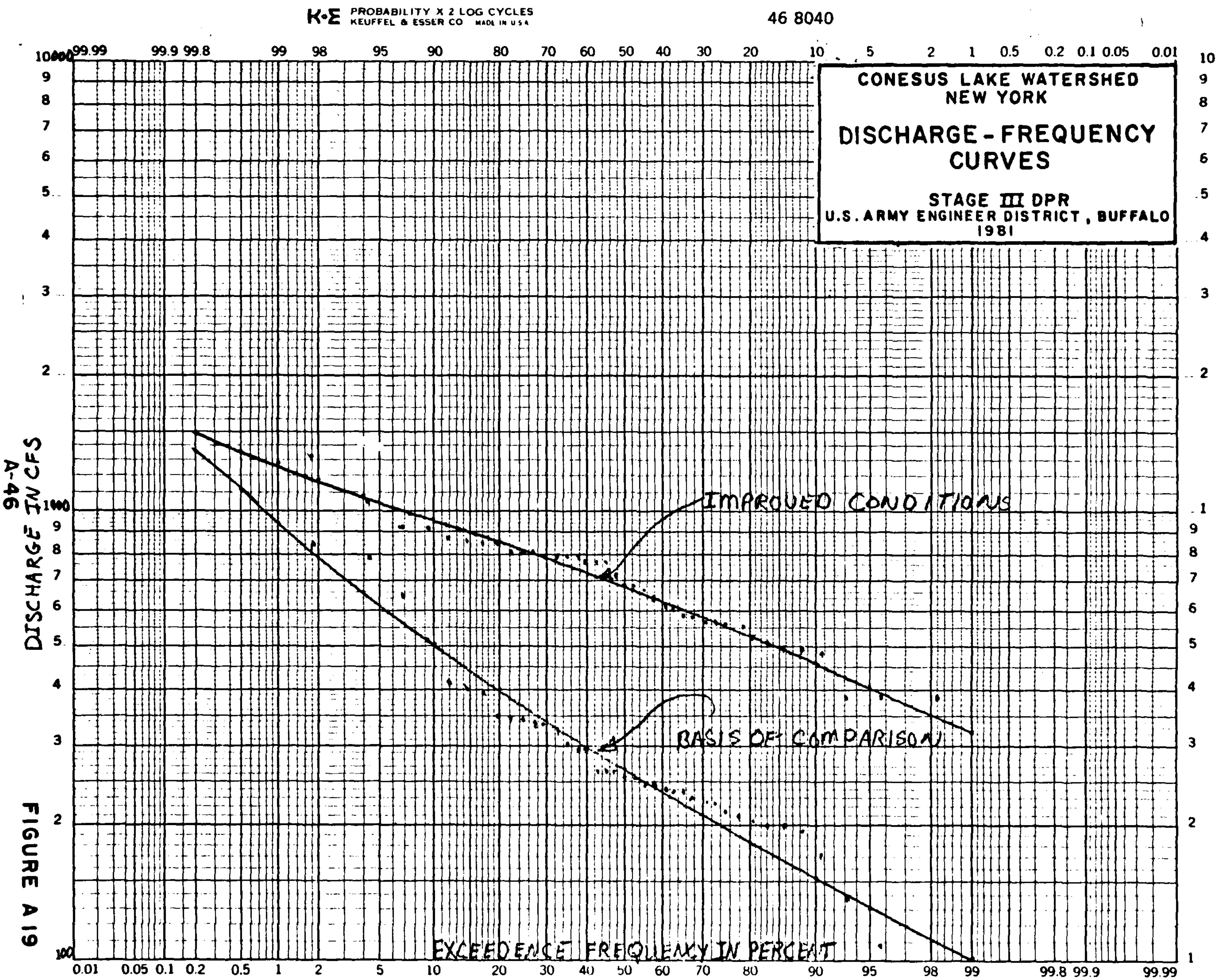
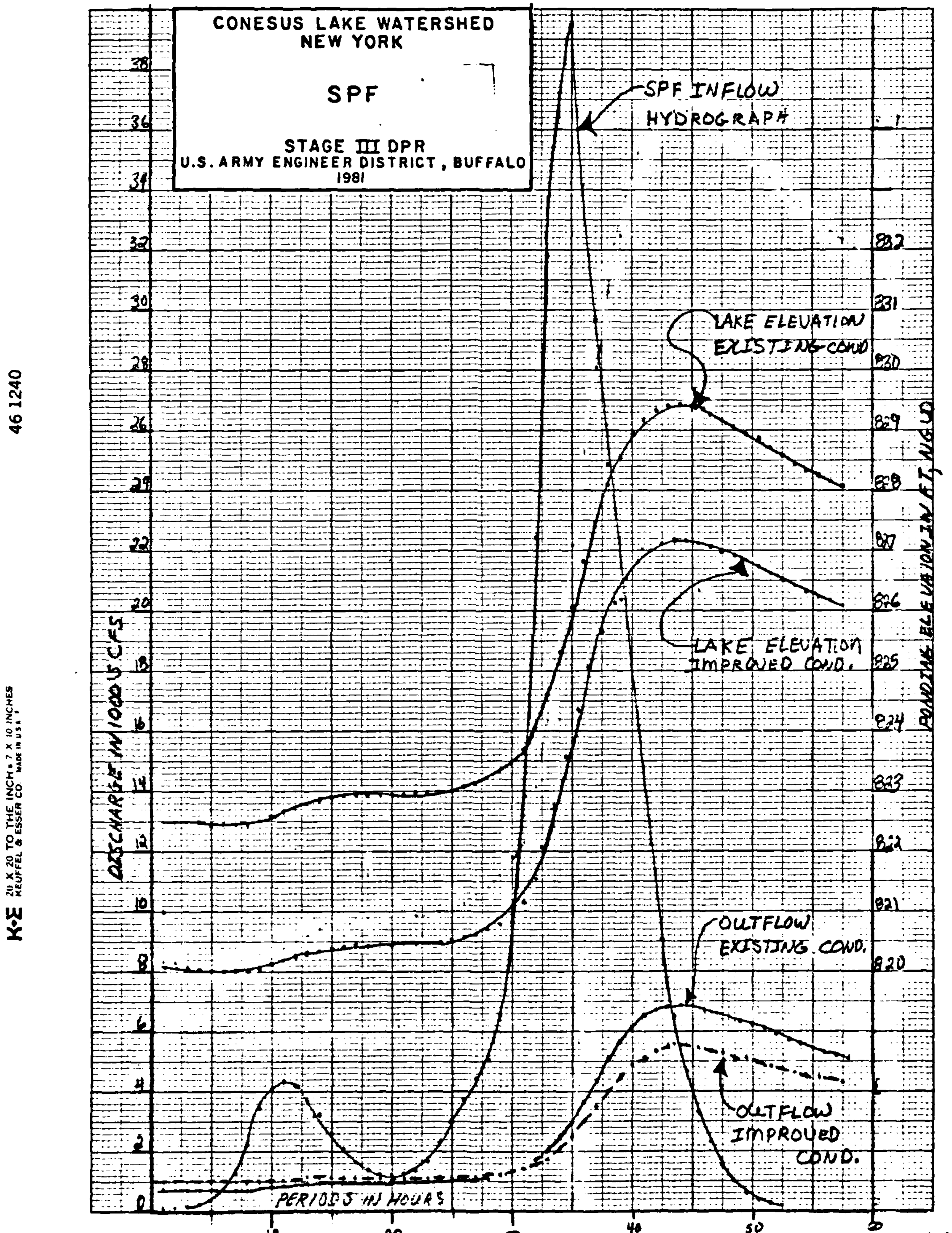

CONESUS LAKE WATERSHED
NEW YORK
STAGE - FREQUENCY CURVES
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981
• — BASIS OF COMPARISON (BOC)
⊙ — 30-60 PLAN
BASED ON LAKE LEVELS FROM RECORDS OF USGS AND THE VILLAGE OF GENESEO FOR 1941-1979 AND HEC 5 MODELING
PEAK ELEVATION - SPF & PMF
SPF PMF
BOC - 829.4 837.0
30-60 PLAN - 827.2 835.0
'O' DAMAGE
ELEVATION IN FEET USC&GS DATUM
EXCEEDENCE FREQUENCY IN PERCENT
824.0
823.0
822.0
821.0
820.0
819.0
818.0
817.0
816.0

FIGURE A18



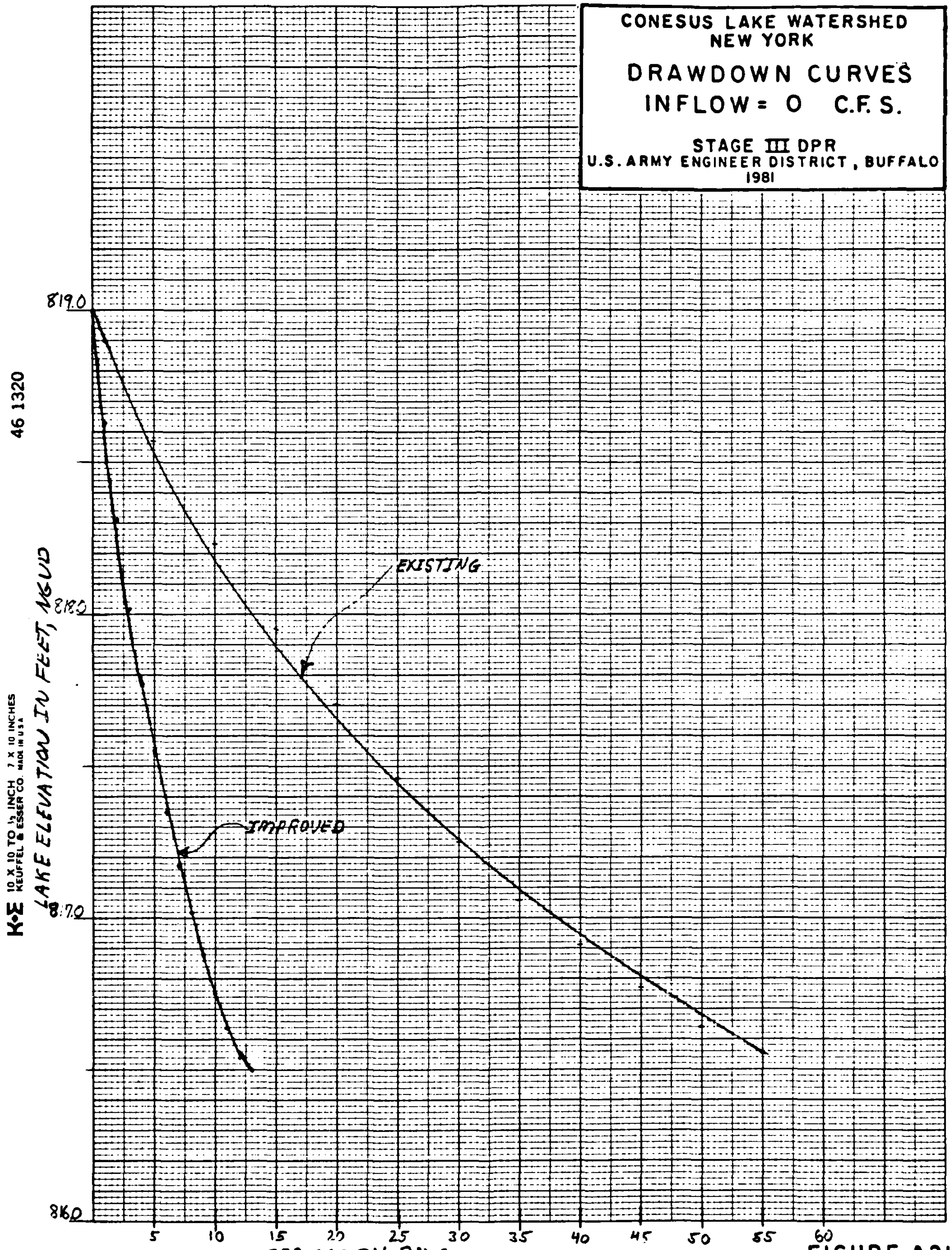
K·E PROBABILITY X 2 LOG CYCLES
KEUFFEL & ESSER CO MADE IN U.S.A.
46 8040
CONESUS LAKE WATERSHED
NEW YORK
DISCHARGE - FREQUENCY
CURVES
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981
IMPROVED CONDITIONS
BASIS OF COMPARISON
EXCEEDENCE FREQUENCY IN PERCENT
DISCHARGE IN CFS

FIGURE A 19



CONESUS LAKE WATERSHED
NEW YORK
SPF
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981
SPF INFLOW HYDROGRAPH
LAKE ELEVATION EXISTING COND.
LAKE ELEVATION IMPROVED COND.
OUTFLOW EXISTING COND.
OUTFLOW IMPROVED COND.
DISCHARGE IN 1000'S CFS
PONDING ELEVATION IN FT, NGVD
PERIODS IN HOURS
K•E 20 X 20 TO THE INCH • 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A.
46 1240

FIGURE A20



CONESUS LAKE WATERSHED
NEW YORK
DRAWDOWN CURVES
INFLOW = 0 C.F.S.
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981
819.0
818.0
817.0
816.0
EXISTING
IMPROVED
LAKE ELEVATION IN FEET, NGVD
5
10
15
20
25
30
35
40
45
50
55
60
PERIODS IN DAYS
46 1320
K•E 10 X 10 TO ½ INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

FIGURE A21

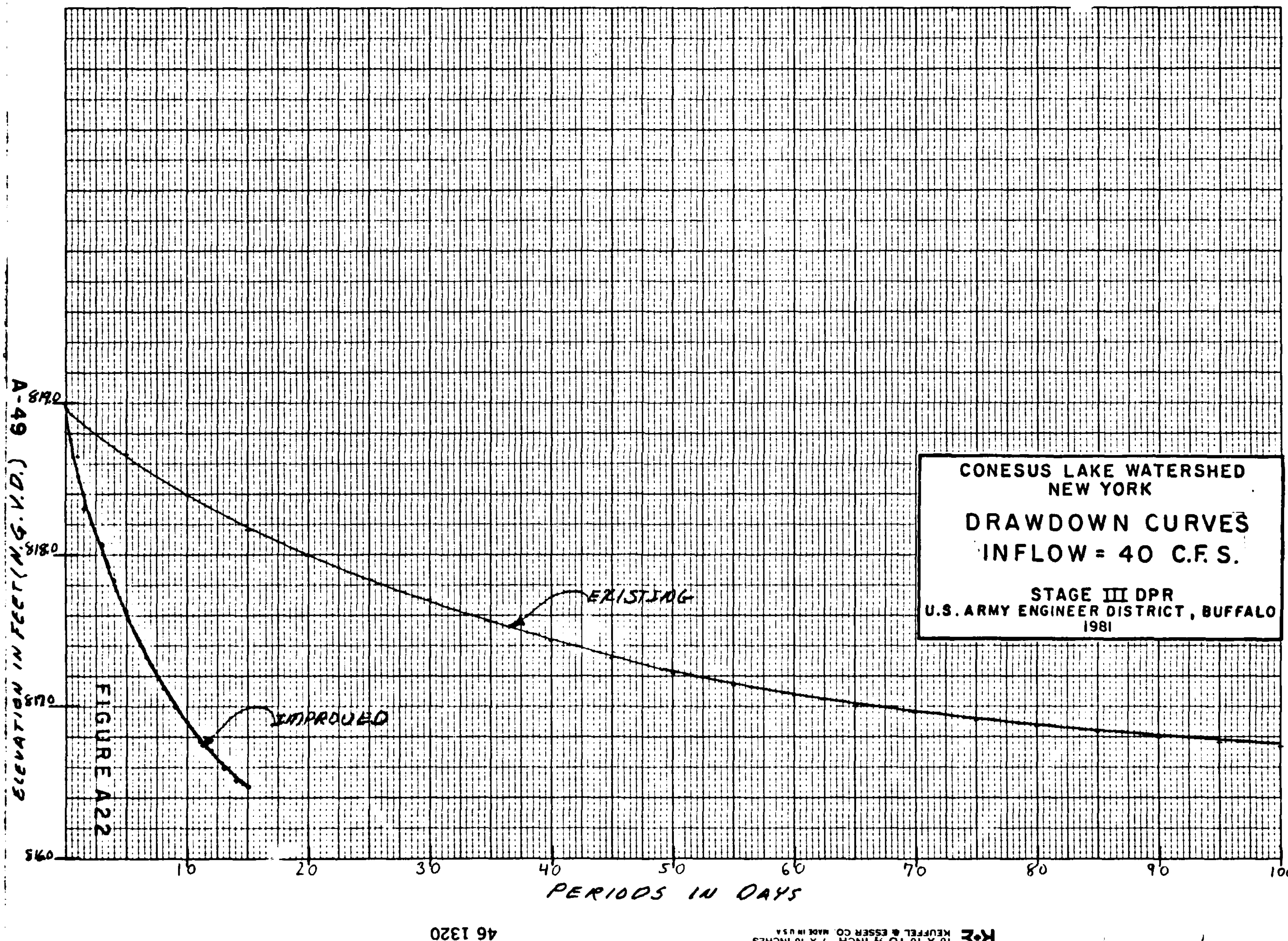

CONESUS LAKE WATERSHED
NEW YORK
DRAWDOWN CURVES
INFLOW = 40 C.F.S.
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981
EXISTING
IMPROVED
ELEVATION IN FEET (N.G.V.D.)
819.0
818.0
817.0
816.0
PERIODS IN DAYS
10
20
30
40
50
60
70
80
90
100
46 1320
K+E 10 X 10 TO ½ INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

FIGURE A22

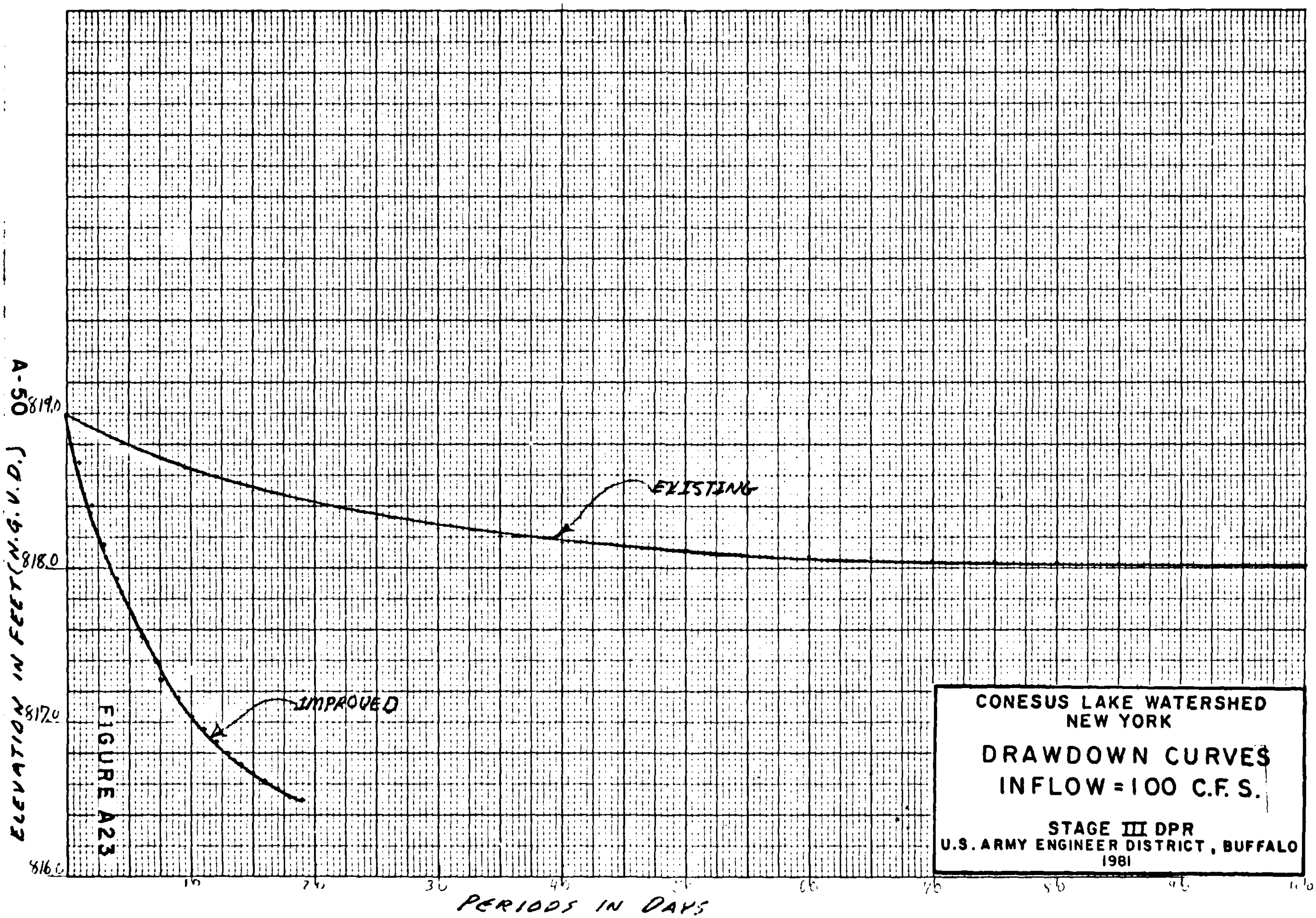

EXISTING
IMPROVED
ELEVATION IN FEET (N.G.V.D.)
819.0
818.0
817.0
816.0
PERIODS IN DAYS
10
20
30
40
60
70
80
100
CONESUS LAKE WATERSHED
NEW YORK
DRAWDOWN CURVES
INFLOW = 100 C.F.S.
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE A23

AD-A115 570 CORPS OF ENGINEERS BUFFALO NY BUFFALO DISTRICT F/G 13/2

STAGE III DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STAT--ETC(U)

SEP 81

UNCLASSIFIED NL

3 of 7

AD A115570

K•E 10 X 10 TO ½ INCH 7 X 10 INCHES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 1320

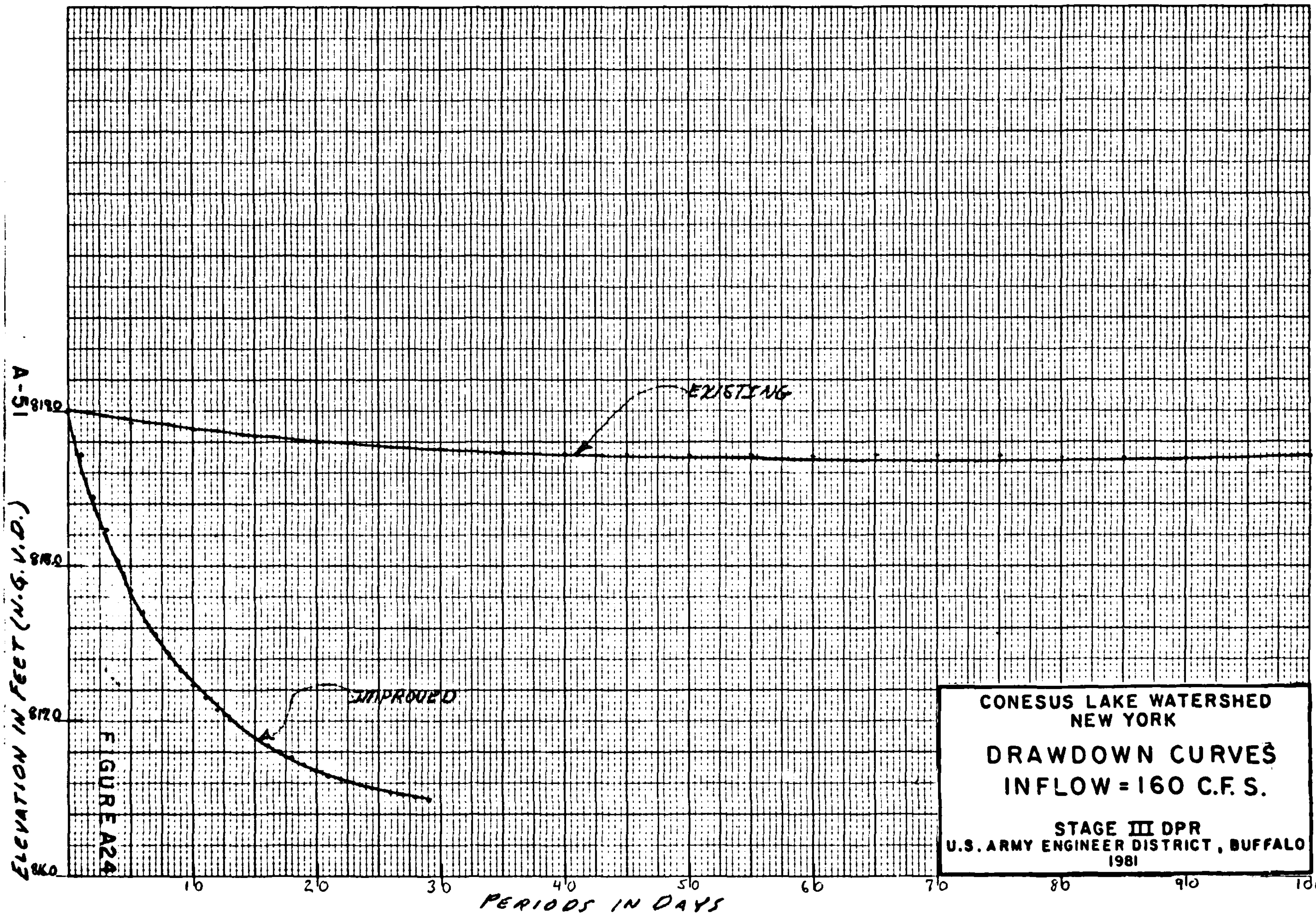


FIGURE A24

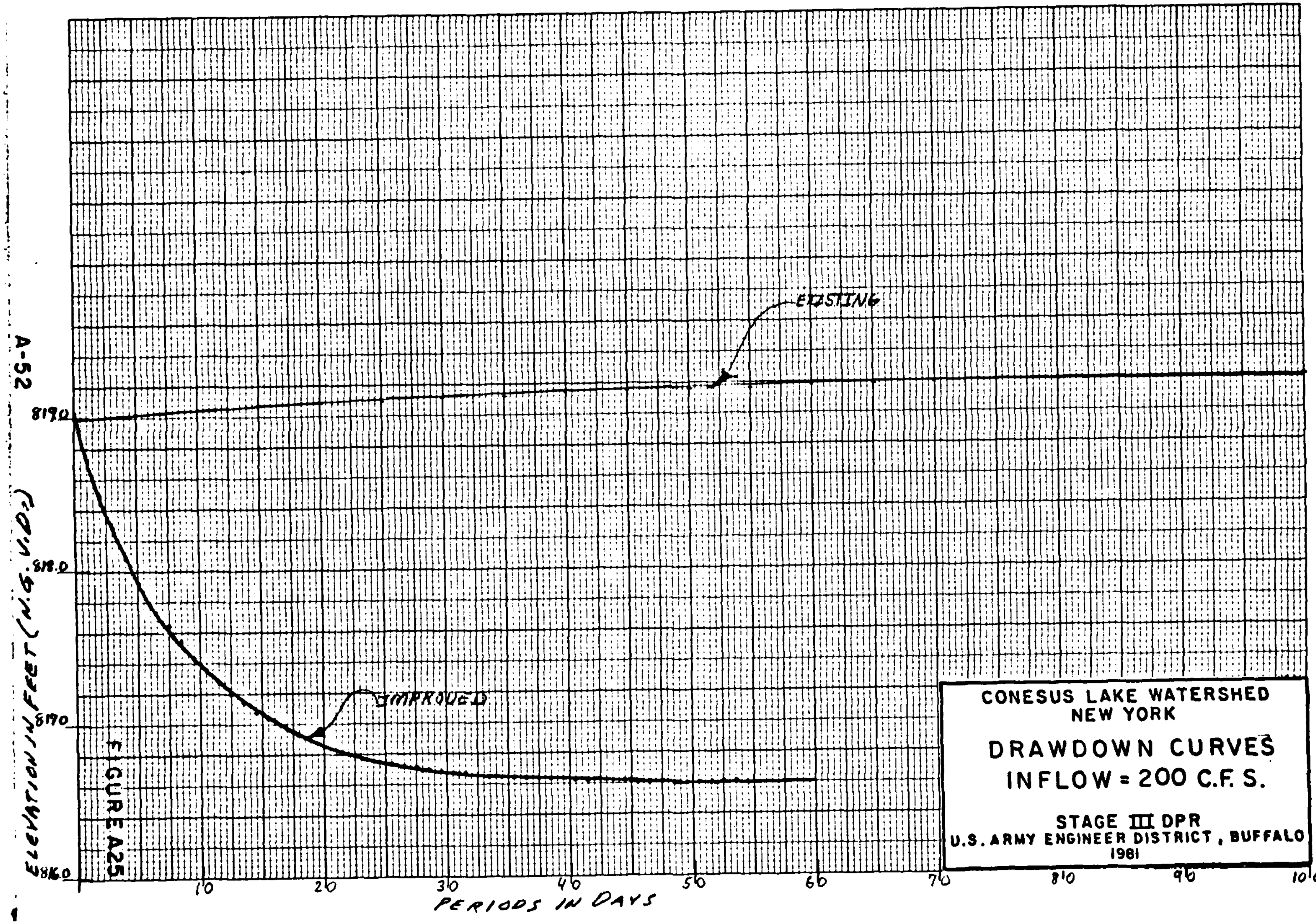

CONESUS LAKE WATERSHED
NEW YORK
DRAWDOWN CURVES
INFLOW = 200 C.F.S.
STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981
EXISTING
IMPROVED
819.0
818.0
817.0
816.0
ELEVATION IN FEET (N.G.V.D.)
0
10
20
30
40
50
60
70
80
90
100
PERIODS IN DAYS

FIGURE A25

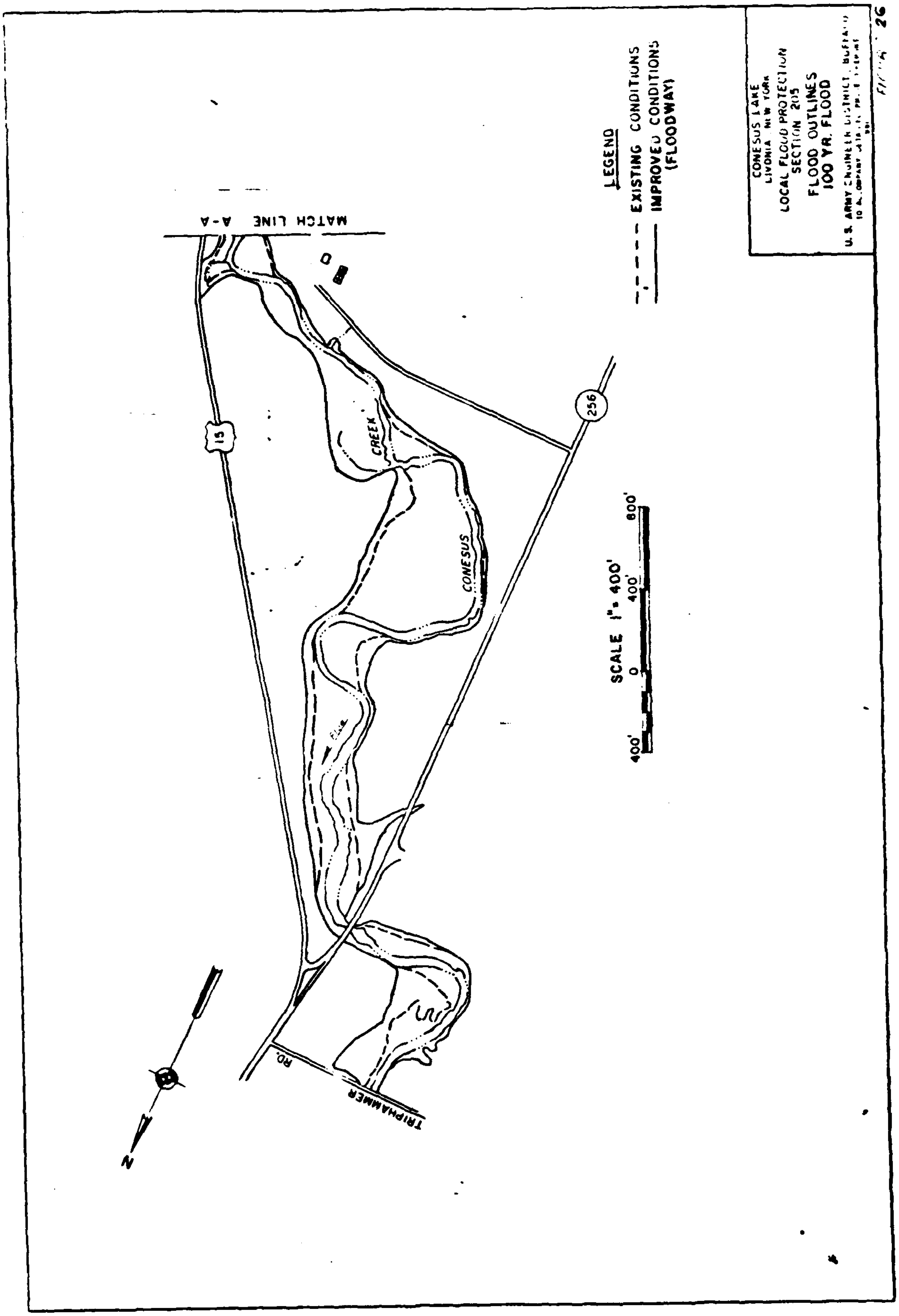
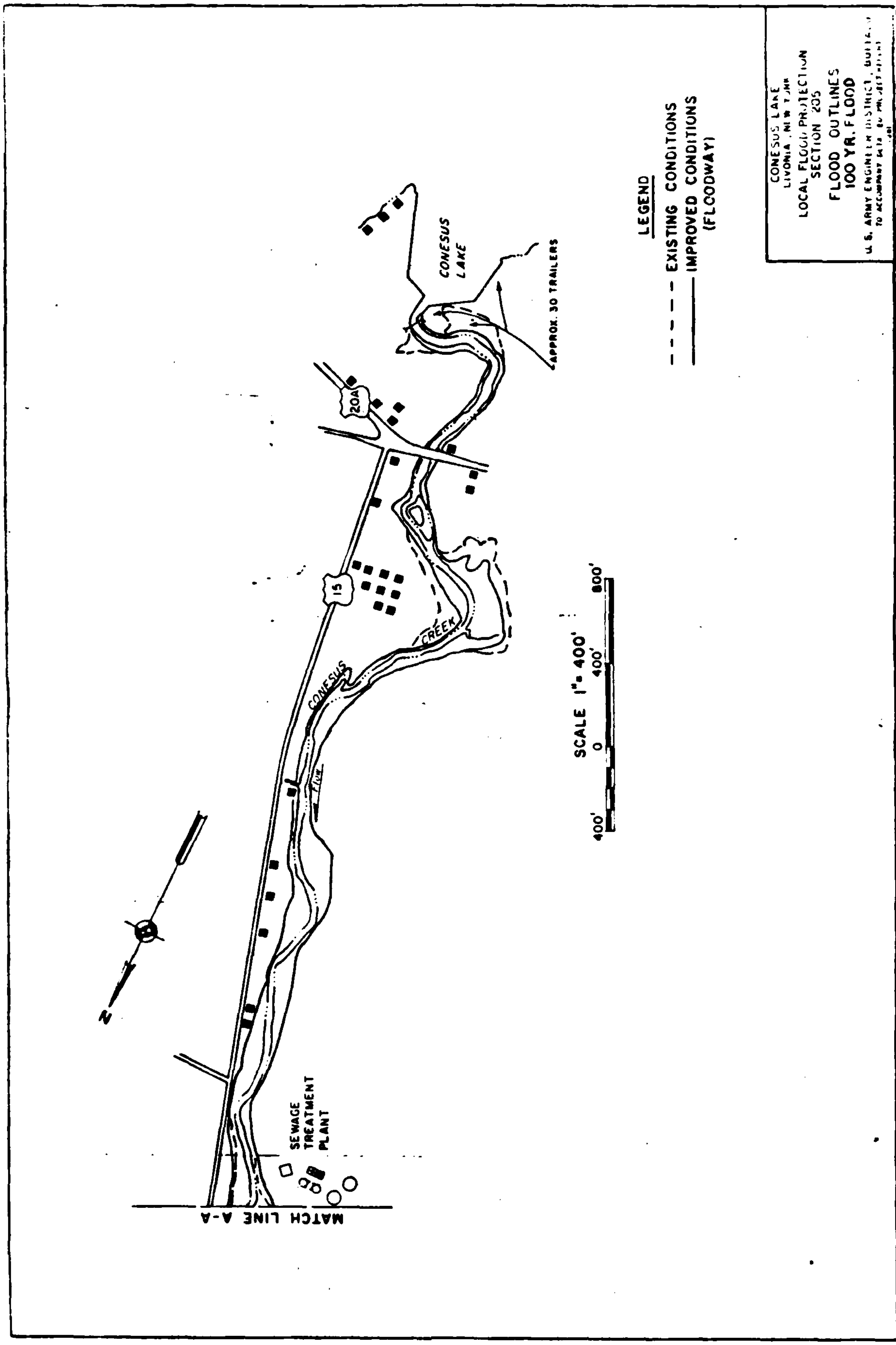

MATCH LINE A-A
LEGEND
EXISTING CONDITIONS
IMPROVED CONDITIONS (FLOODWAY)
CONESUS LAKE
LIVONIA NEW YORK
LOCAL FLOOD PROTECTION
SECTION 205
FLOOD OUTLINES
100 YR. FLOOD
U.S. ARMY ENGINEER DISTRICT, BUFFALO
15
256
CREEK
CONESUS
SCALE 1"= 400'
400' 0 400' 800'
TRIPHAMMER RD.
N

FIGURE A26



CONESUS LAKE
LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
SECTION 205
FLOOD OUTLINES
100 YR. FLOOD
LEGEND
EXISTING CONDITIONS
IMPROVED CONDITIONS
(FLOODWAY)
CONESUS LAKE
APPROX. 30 TRAILERS
20A
15
CONESUS
CREEK
FLOW
SCALE 1"= 400'
400'
0
400'
800'
N
SEWAGE TREATMENT PLANT
MATCH LINE A-A

FIGURE A27

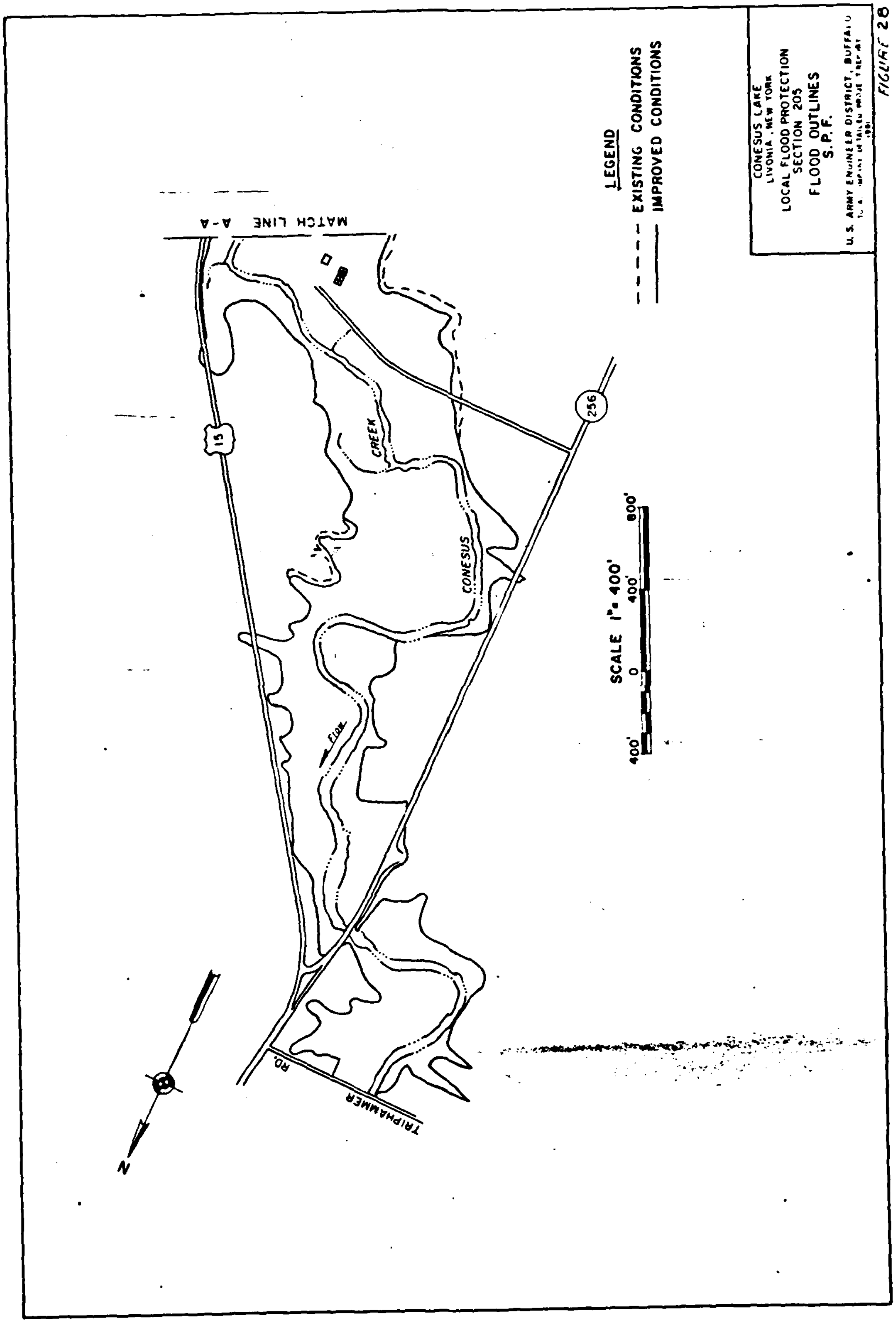

CONESUS LAKE
LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
SECTION 205
FLOOD OUTLINES
S.P.F.
U.S. ARMY ENGINEER DISTRICT, BUFFALO
FIGURE 28
LEGEND
EXISTING CONDITIONS
IMPROVED CONDITIONS
MATCH LINE A-A
SCALE 1"= 400'
400'
0
400'
800'
CREEK
CONESUS
FLOW
15
256
TRIPHAMMER RD.
N

FIGURE A28

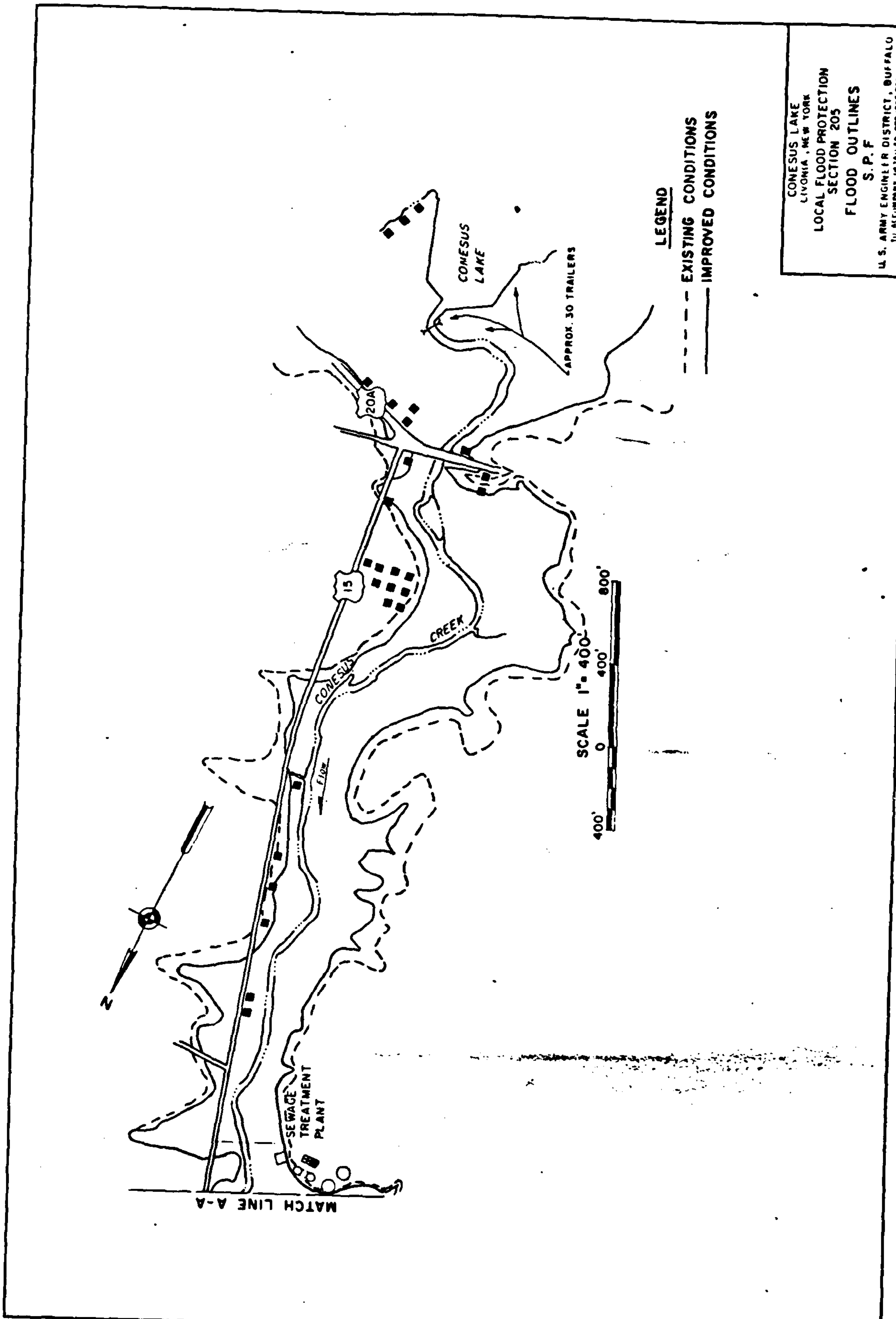

CONESUS LAKE
LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
SECTION 205
FLOOD OUTLINES
S.P.F
U.S. ARMY ENGINEER DISTRICT, BUFFALO
LEGEND
EXISTING CONDITIONS
IMPROVED CONDITIONS
CONESUS LAKE
APPROX. 30 TRAILERS
20A
15
CONESUS CREEK
flow
SCALE 1"= 400'
400' 0 400' 800'
N
SEWAGE TREATMENT PLANT
MATCH LINE A-A

FIGURE A29

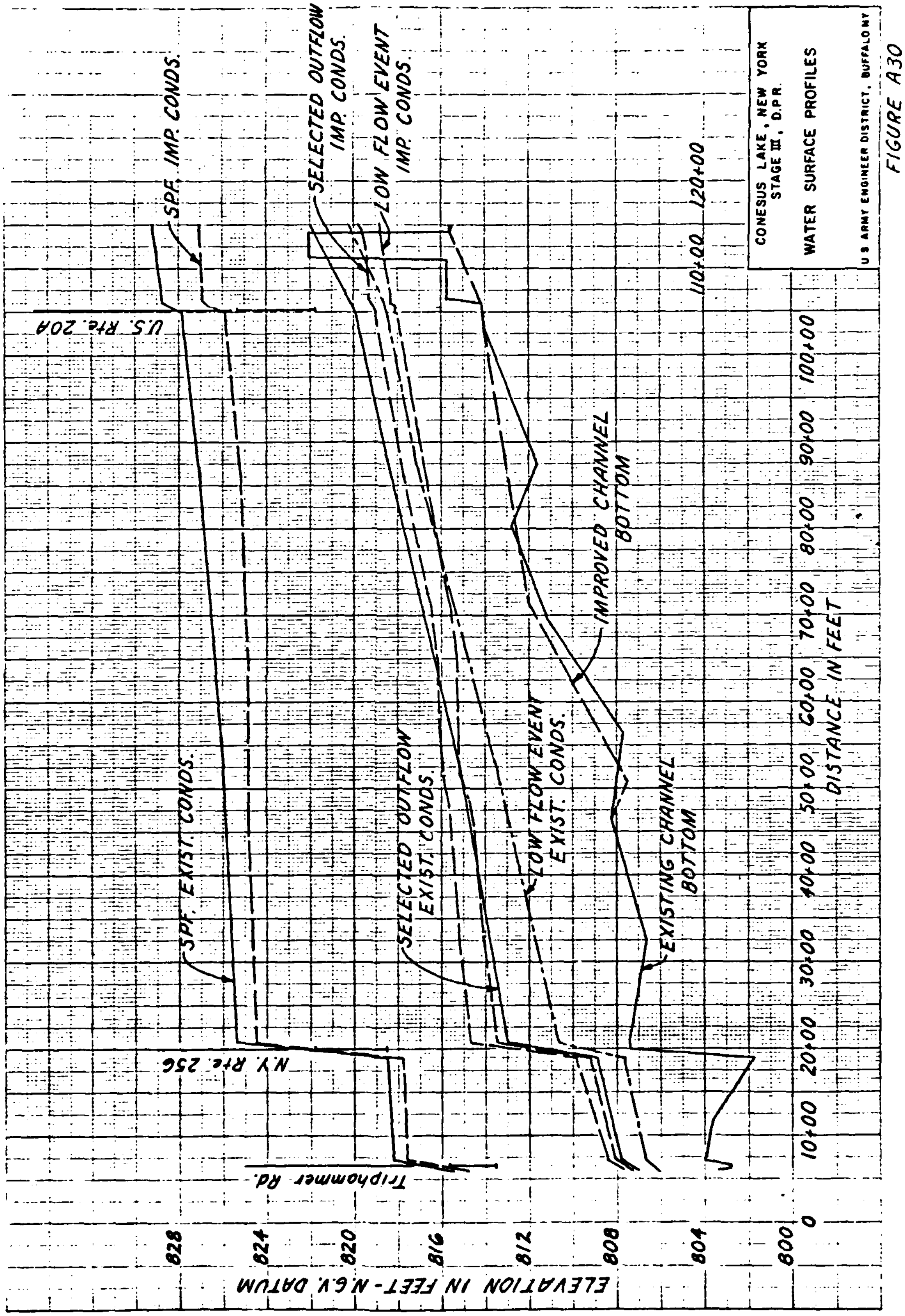

CONESUS LAKE, NEW YORK
STAGE III, D.P.R.
WATER SURFACE PROFILES
U.S. ARMY ENGINEER DISTRICT, BUFFALO, NY
FIGURE A30
SPF. IMP. CONDS.
SELECTED OUTFLOW IMP. CONDS.
LOW FLOW EVENT IMP. CONDS.
U.S. Rte. 20A
IMPROVED CHANNEL BOTTOM
SPF. EXIST. CONDS.
SELECTED OUTFLOW EXIST. CONDS.
LOW FLOW EVENT EXIST. CONDS.
EXISTING CHANNEL BOTTOM
N.Y. Rte. 256
Triphammer Rd.
ELEVATION IN FEET - N.G.V. DATUM
828
824
820
816
812
808
804
800
DISTANCE IN FEET
0
10+00
20+00
30+00
40+00
50+00
60+00
70+00
80+00
90+00
100+00
110+00
120+00

FIGURE A30

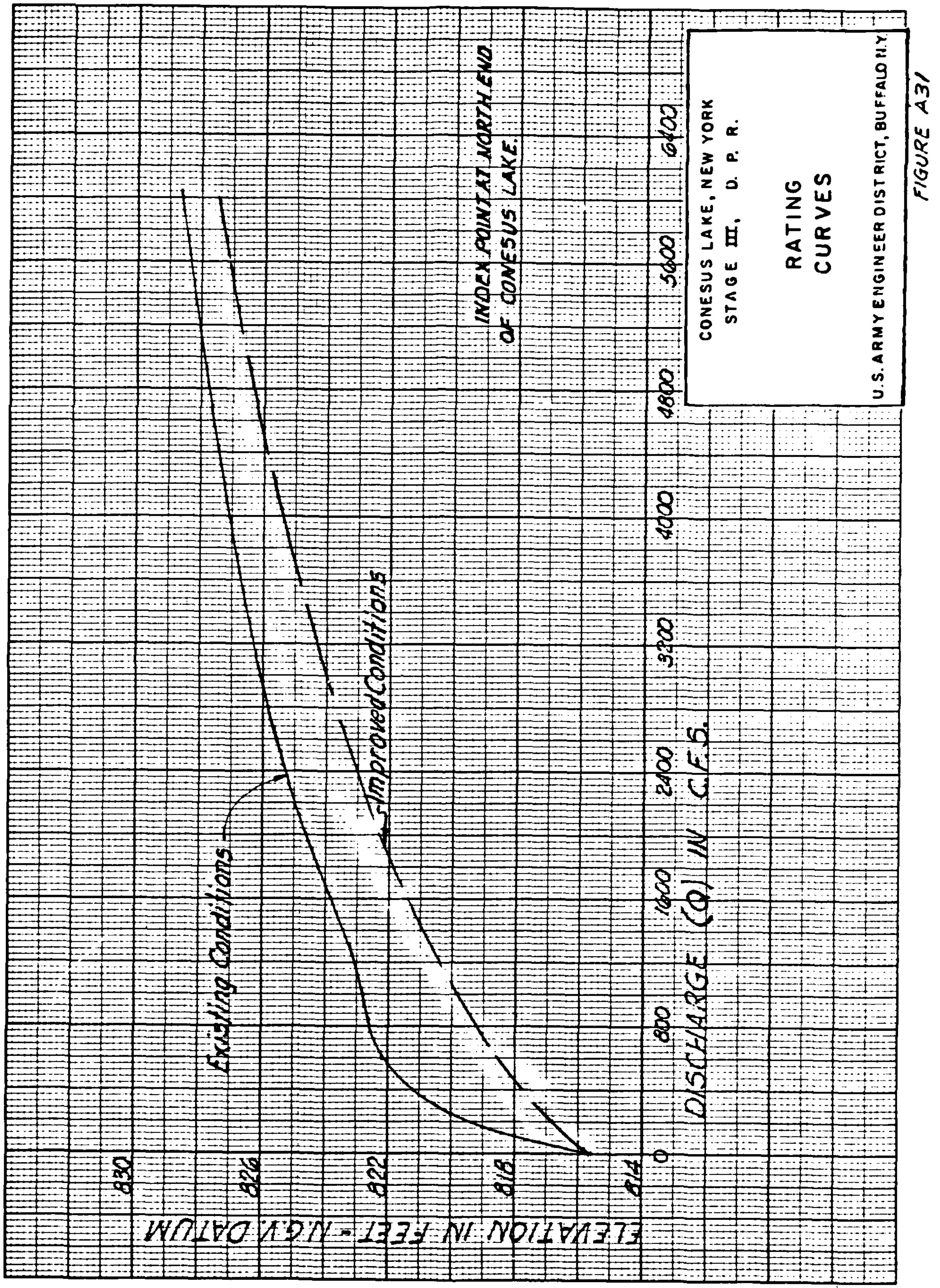
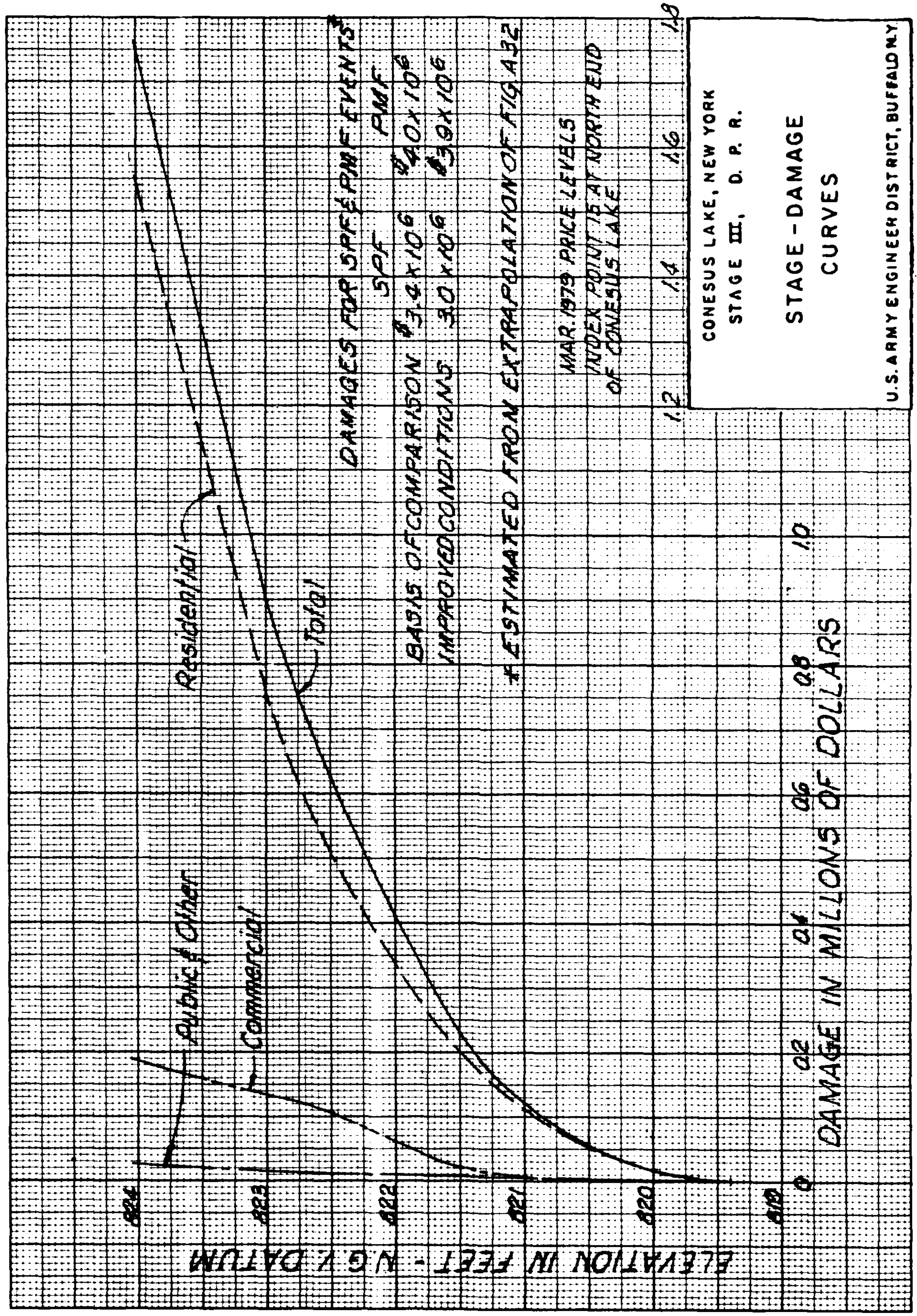
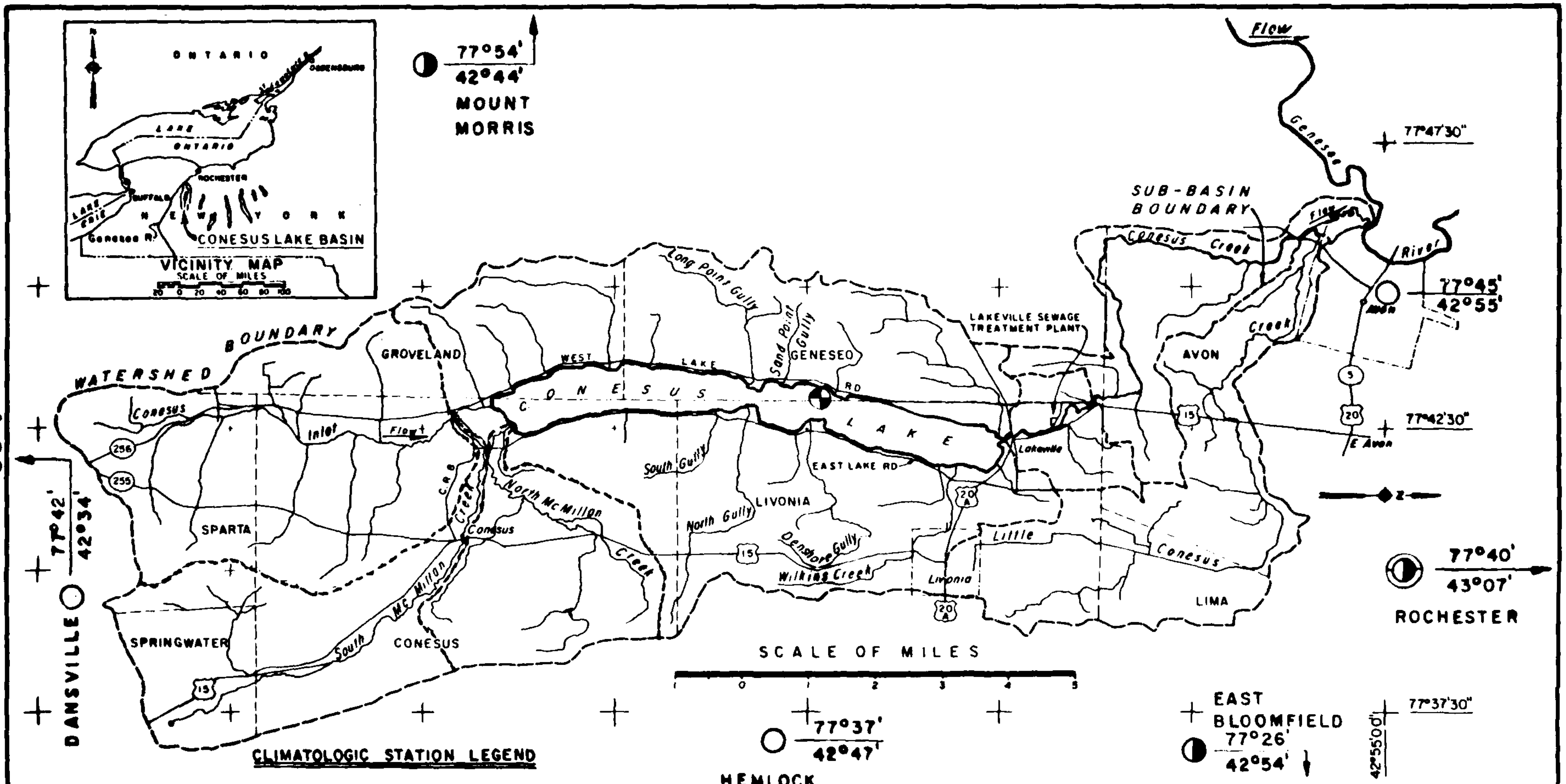

CONESUS LAKE, NEW YORK
STAGE III, D. P. R.
RATING CURVES
U.S. ARMY ENGINEER DISTRICT, BUFFALO N.Y.
FIGURE A31
INDEX POINT AT NORTH END OF CONESUS LAKE.
Existing Conditions
Improved Conditions
DISCHARGE (Q) IN C.F.S.
ELEVATION IN FEET - N.G.V. DATUM
0
800
1600
2400
3200
4000
4800
5600
6400
814
818
822
826
830

FIGURE A31



CONESUS LAKE, NEW YORK
STAGE III, D. P. R.
STAGE - DAMAGE
CURVES
U.S. ARMY ENGINEER DISTRICT, BUFFALO N.Y.
FIGURE A32
DAMAGES FOR SPF & PMF EVENTS*
SPF PMF
BASIS OF COMPARISON $3.4X10^6 $4.0X10^6
IMPROVED CONDITIONS $3.0X10^6 $3.9X10^6
* ESTIMATED FROM EXTRAPOLATION OF FIG A32
MAR. 1979 PRICE LEVELS
INDEX POINT IS AT NORTH END OF CONESUS LAKE
Residential
Total
Public & Other
Commercial
ELEVATION IN FEET - N.G.V. DATUM
824
823
822
821
820
819
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
DAMAGE IN MILLONS OF DOLLARS

FIGURE A32



CLIMATOLOGIC STATION LEGEND

- PRECIPITATION ONLY
- PRECIPITATION AND TEMPERATURE

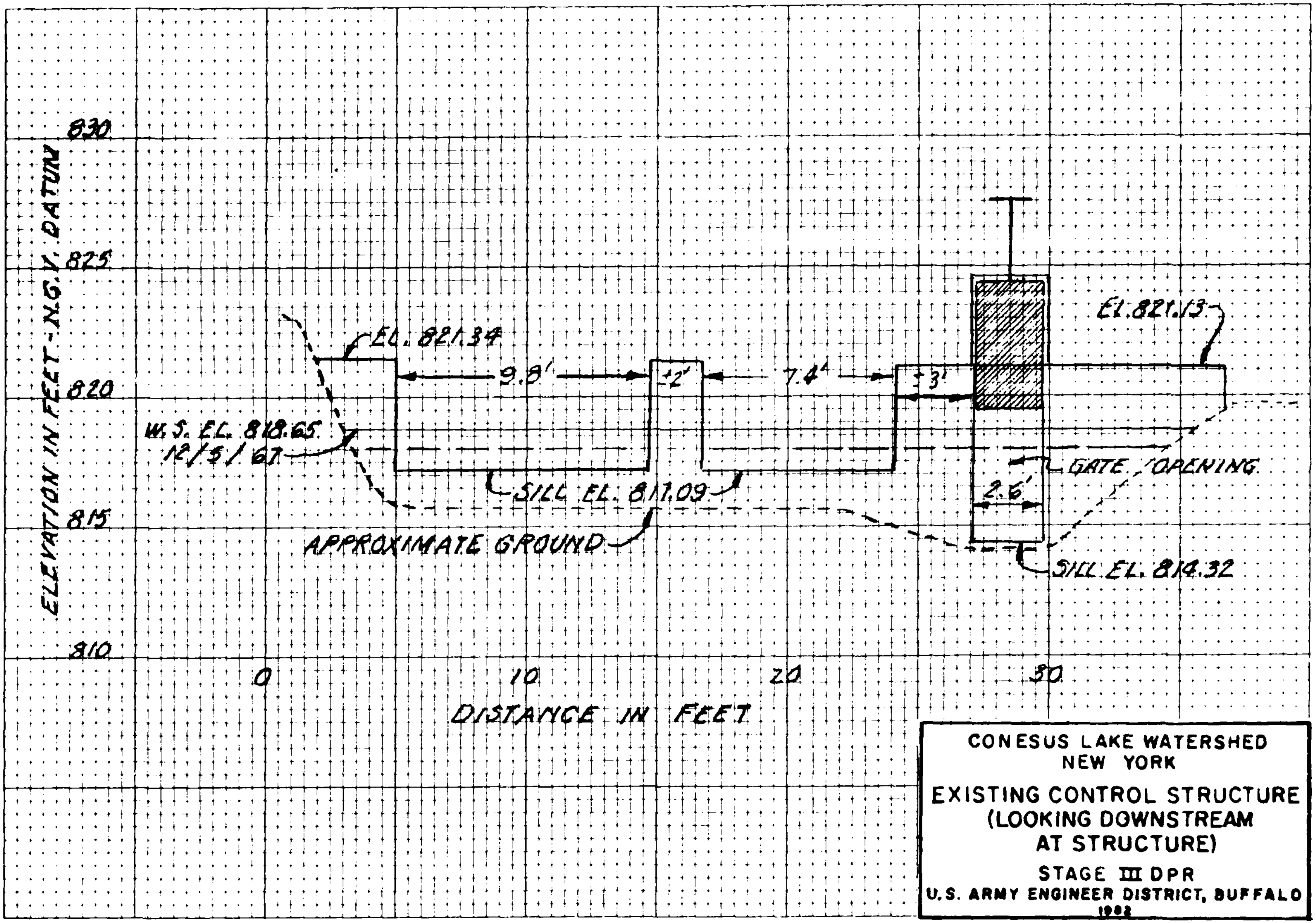
TYPE OF GAGE

- NON RECORDING
- RECORDING
- BOTH TYPES
- FIRST ORDER STATION
- LAKE LEVEL GAGE

CONESUS LAKE WATERSHED
NEW YORK

WATERSHED MAP

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981



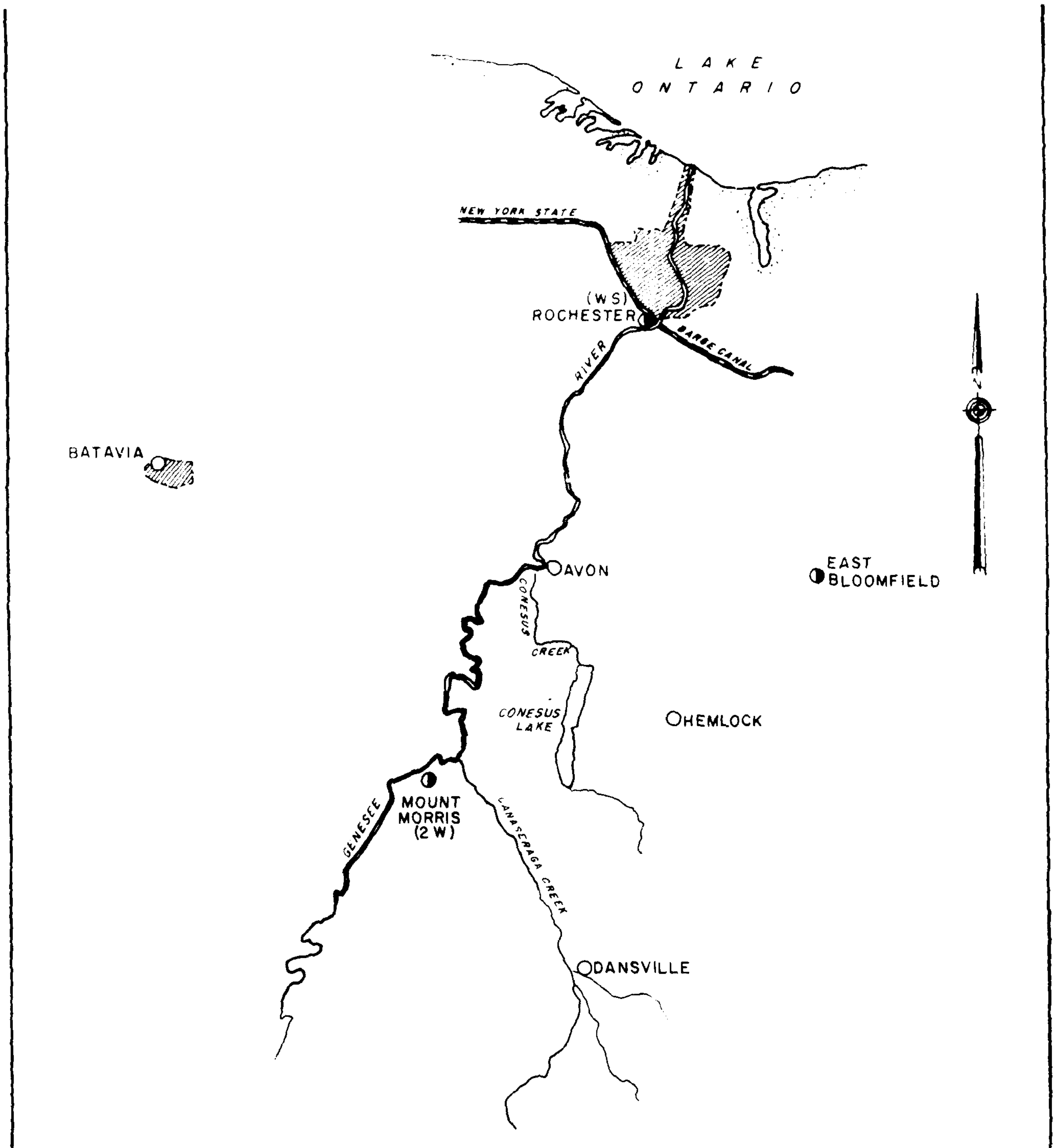
CONESUS LAKE WATERSHED
NEW YORK

EXISTING CONTROL STRUCTURE
(LOOKING DOWNSTREAM
AT STRUCTURE)

STAGE III DPR

U.S. ARMY ENGINEER DISTRICT, BUFFALO
1982

PLATE A2



CLIMATOLOGIC STATION LEGEND

PRECIPITATION ONLY

PRECIPITATION AND TEMPERATURE

TYPE OF GAGE

NON RECORDING

RECORDING

BOTH TYPES

FIRST ORDER STATION

CONESUS LAKE WATERSHED
NEW YORK

CLIMATOLOGIC
STATIONS

STAGE III DPR
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX B
ECONOMICS

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

APPENDIX B

RESOURCES AND ECONOMY

TABLE OF CONTENTS

TABLE OF CONTENTS (cont.)

LIST OF TABLES

LIST OF TABLES (cont.)

LIST OF FIGURES

DETAILED PROJECT REPORT
CONESUS LAKE
APPENDIX B
RESOURCES AND ECONOMY

AFFECTED AREA

GENERAL DESCRIPTION

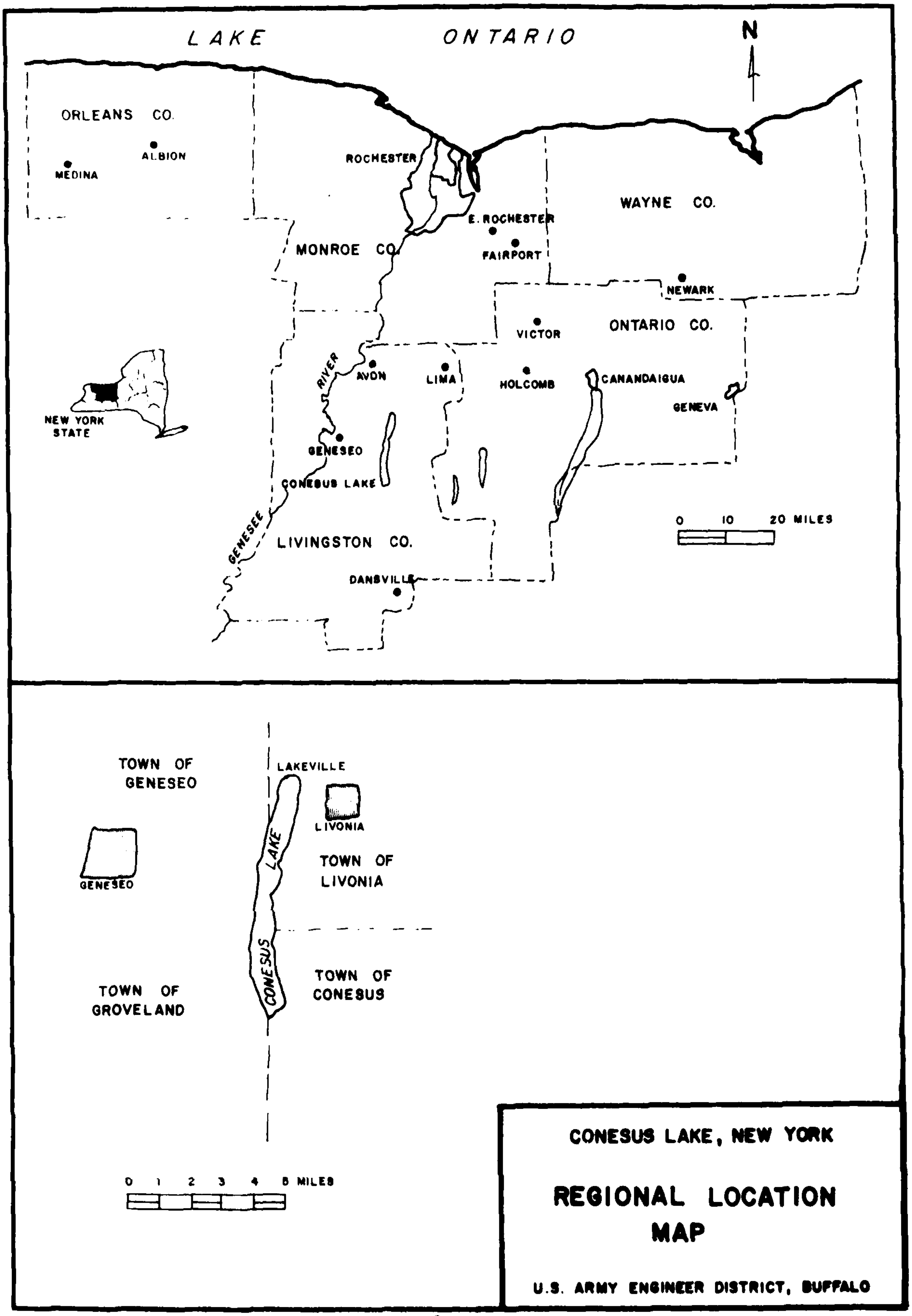
Conesus Lake is located in the Genesee Valley in the Finger Lakes Region of New York State. It is the most westerly of the eleven Finger Lakes and is the largest of the five "little Finger Lakes". Conesus Lake is easily accessible from several urbanized areas of New York, as it is located about 25 miles from Rochester, 65 miles from Buffalo, and 100 miles from Syracuse.

The lake is situated in Livingston County, which is included in the eight-county Genesee/Finger Lakes Planning Council (G/FLPC) region, as well as within the five-county Rochester Standard Metropolitan Statistical Area (SMSA). The G/FLPC is responsible for broad regional planning and serves as a clearing house for county or local plans. The five-county Rochester SMSA contains those counties in closest proximity to Rochester, as shown in Figure B1.

The SMSA is a geographical area defined by the U.S. Department of Commerce and is used as a basis for presenting statistical information about an area. Also shown in Figure B1 is the geographical setting for Lake Conesus and the four towns which include part of the lake in their jurisdiction - Livonia, Conesus, Groveland, and Geneseo. Figure B2 is a schematic map of the Conesus Lake area.

The affected area for the proposed Conesus Lake flood management project consists of the Conesus Lake floodplain, the Conesus Creek outlet stream, and all other nearby areas likely to serve as alternative sites for any major type of activity that might use the floodplain if it were protected. In this case the affected area includes the Rochester SMSA; this is based on the assumption that lake front residential development could take place in any of the four surrounding counties, or in Livingston County, especially in the upland areas. Industrial and commercial activity were not considered alternatives in this project; recreation is a constrained alternative due to the limited lake access for the public.

The generalized land use for the Lake Conesus watershed is shown in Figure B3. This is derived from the LUNR (Land Use Natural Resources) map prepared by Cornell University.



CONESUS LAKE, NEW YORK

REGIONAL LOCATION MAP

U.S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE B-1

REVISIONS BY ____ DATE ____

FILE ____

BY ____ DATE ____
CHECKED BY ____

944.7 (REV. 6-61)

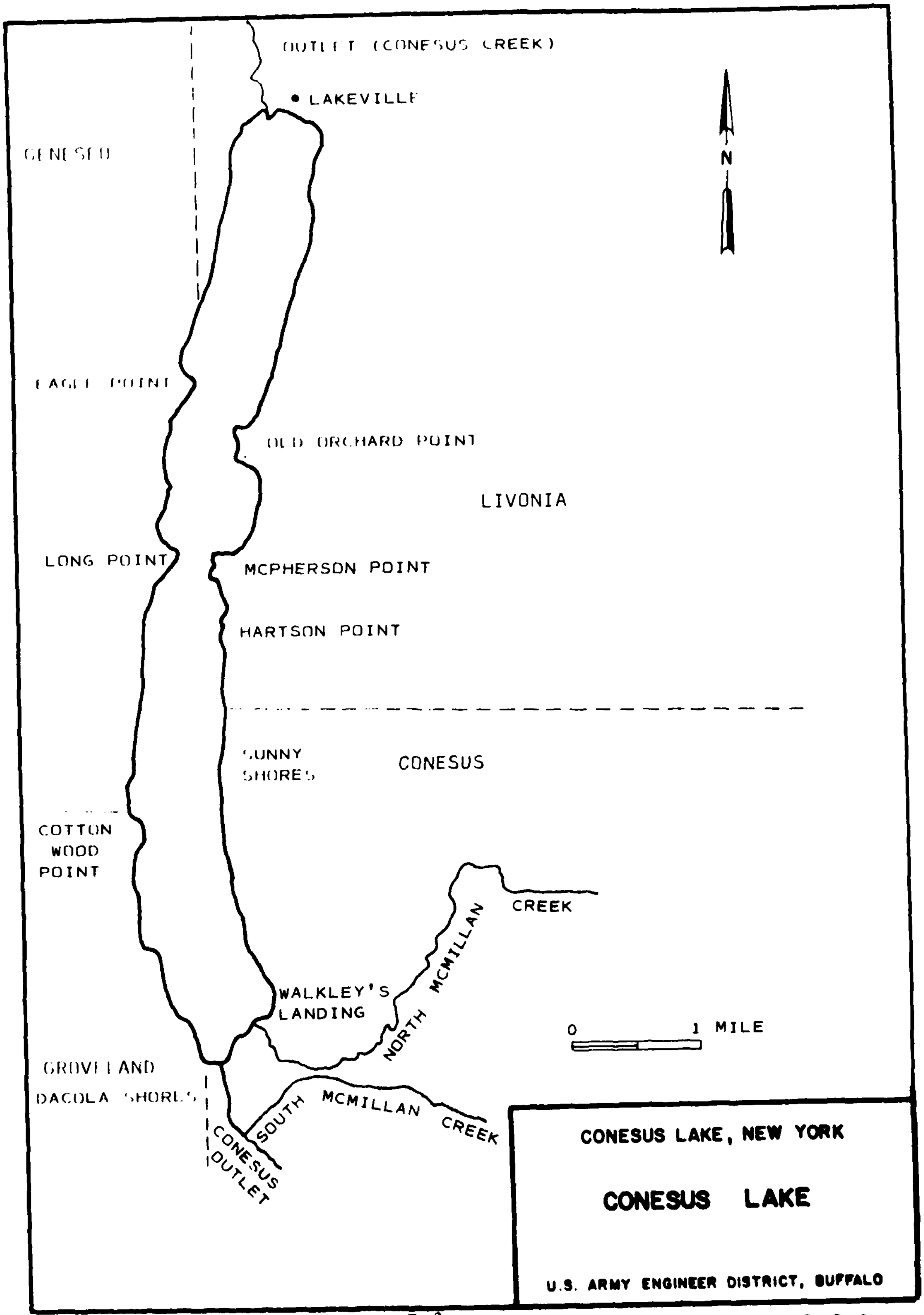
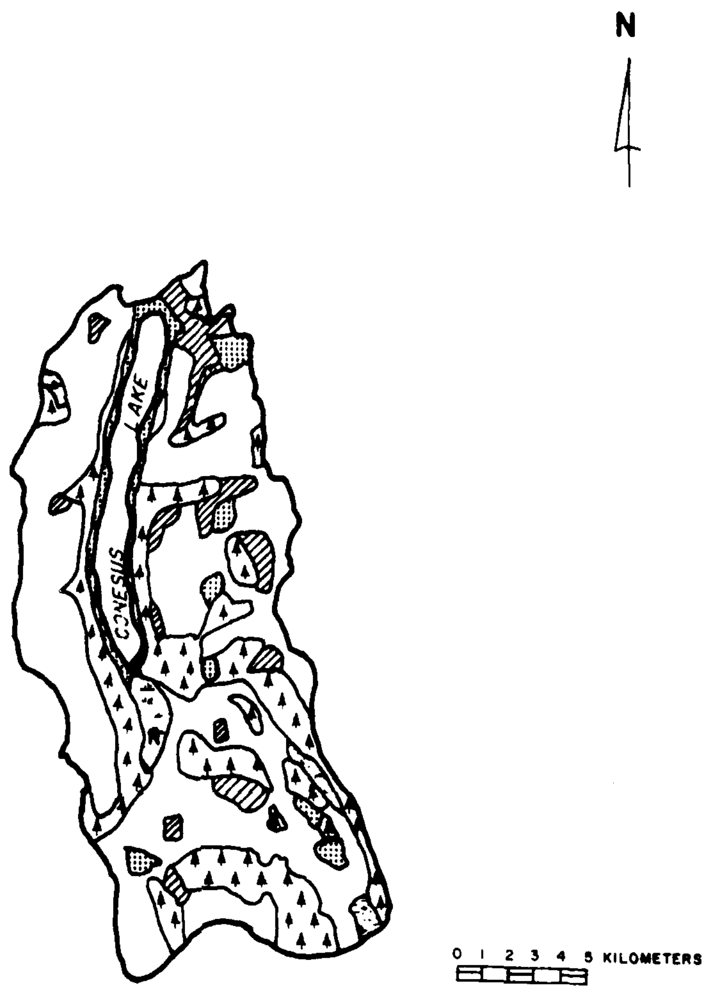

OUTLET (CONESUS CREEK)
LAKEVILLE
N
GENESEO
EAGLE POINT
OLD ORCHARD POINT
LIVONIA
LONG POINT
MCPHERSON POINT
HARTSON POINT
SUNNY SHORES
CONESUS
COTTON WOOD POINT
CREEK
NORTH MCMILLAN
WALKLEY'S LANDING
0 1 MILE
GROVELAND
DACOLA SHORES
SOUTH MCMILLAN CREEK
CONESUS OUTLET
CONESUS LAKE, NEW YORK
CONESUS LAKE
U.S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE B-2



EXPLANATION:

- ACTIVE FARMLAND
- INACTIVE FARMLAND
- RESIDENTIAL OR PUBLIC
- FOREST
- WETLAND
- R WILDLIFE REFUGE

REFERENCE NEW YORK STATE LUNR MAP PREPARED BY CORNELL UNIV.

CONESUS LAKE, NEW YORK

WATERSHED LAND USE MAP

U.S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE B-3

REVISIONS BY ____ DATE ____

FILE ____

BY ____ DATE ____
CHECKED BY ____

944.7 (REV. 6-61)

Table B1 - Population

	Number of Persons				Percent Change		
	1950	1960	1970	1980	1950-1960	1960-1970	1970-1980
Rochester SMSA	675,216	800,658	961,516	971,879	18.3	20.1	1.1
Livingston County	40,257	44,053	54,041	57,006	9.4	22.7	5.5
Conesus (T)	809	1,221	1,533	1,970	50.1	25.6	28.5
Geneseo (T)	3,782	4,337	7,278	8,673	14.7	67.8	19.2
Groveland (T)	3,381	3,373	3,004	2,140	-0.2	10.9	-28.8
Livonia (T)	2,896	3,526	5,304	5,742	21.8	50.4	8.3

Source: Rochester Area Business Fact Book, Part 2, 1974.

1980 Census of Population and Housing - Advance Reports - New York

Table B2 - Population: Age Distribution

C = City T = Town V = Village U = Unincorporated Place	AGE OF POPULATION, 1970								
			AGE GROUPS - Percentage of Population						
	Median Age	18 and Over	Under 5	5-14	15-24	25-44	45-54	55-64	65 and Over
New York State	30.3	68.0	8.2	18.6	16.2	24.2	12.0	10.1	10.8
Upstate New York[1]	28.4	65.6	8.6	20.1	17.0	22.7	11.6	9.4	10.6
Rochester SMSA[2]	27.7	65.3	9.1	20.2	17.0	23.8	11.4	8.8	9.8
Livingston County	25.9	65.8	8.6	20.2	20.1	22.3	10.4	8.9	9.6
Conesus (T)	26.1	59.8	10.9	23.9	13.7	23.5	10.8	8.0	9.2
Geneseo (T)	22.2	79.1	4.8	12.4	46.4	15.7	6.9	5.6	8.1
Groveland (T)	34.5	74.1	4.4	15.6	16.9	27.5	15.9	10.0	9.7
Livonia (T)	26.7	63.6	9.9	21.3	16.3	22.6	10.4	8.9	10.6

[1] Excludes New York City and Nassau, Putnam, Rockland, Suffolk and Westchester Counties.

[2] Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1974.

Table B3 - Housing Data - 1970

C = City T = Town V = Village U = Unincorporated Place	Total Number	Occupied: Number	Occupied: Percent Owner-Occupied	Seasonally Vacant	Percent of All Year-round Units: Year Structure Built: 1960-March 1970	Year Structure Built: 1940-1959	Year Structure Built: 1939 or Earlier	All Plumbing Facilities	With More Than One Bathroom	With Central Heating or Built-in Electrical Units
New York State	6,299,582	5,913,861	47.3	144,537	16.8	27.7	55.6	96.8	24.1	93.8
Upstate New York[1]	2,253,654	2,021,363	67.1	107,937	17.3	23.7	59.1	95.6	24.8	87.8
Rochester SMSA[2]	311,839	294,263	67.3	5,839	22.5	22.8	54.6	96.7	30.8	93.2
Livingston County	16,845	15,088	74.8	790	20.9	14.5	64.5	94.0	23.2	84.7
Conesus (T)	701	427	84.3	147	27.1	13.2	59.7	87.4	12.1	67.2
Geneseo (T)	1,846	1,506	65.1	222	37.6	12.3	50.0	97.5	32.1	91.5
Groveland (T)	551	404	71.3	63	14.1	23.9	62.0	91.4	11.1	75.7
Livonia (T)	2,100	1,627	79.1	321	24.9	19.6	55.5	93.5	20.6	87.8

[1]Excludes New York City and Nassau, Putnam, Rockland, Suffolk and Westchester Counties.

[2]Livingston, Monroe, Ontario, Orleans, and Wayne Counties.

Source: Rochester Area Business Fact Book Part 2, 1974.

ECONOMIC BASE

The following sections include discussions of the economic and infrastructure factors that influence the affected area for this study.

Population

The Rochester area experienced slightly greater than 21% growth in the twenty years preceeding the 1980 Census, as shown on Tabel B1.

Livingston County has a very low growth rate during the 1950-1960 decade, but experienced a population increase of nearly 23% in the following ten years, indicating a shift to rural living in those towns on the northern shores of Conesus Lake. The extraordinary growth in Geneseo is due primarily to the increased enrollment at the State University College of New York at Geneseo. The Town of Conesus showed a relatively higher increase in the 1950-60 period due to some new housing at the south end of the lake. The Villages of Geneseo and Livonia, both of which provide commercial services to Conesus Lake residents, also experienced growth during this period.

The Town of Groveland expreienced a declining population base in the last two decades due in part to the consolidation of farms.

The age distribution of the area population, as shown in Table B2, generally parallels that of the State; however, Livingston County exhibits some notable exceptions. The presence of the college in Geneseo is reflected in the high proportion of persons in the 15-24 age bracket. The population of Groveland tends to be slightly older than the other towns surrounding Conesus Lake.

Housing

Housing data for the area are presented in Tables B3 through B7, based on the 1970 Census. The housing stock in the SMSA consisted primarily of single family dwellings (65.3%) constructed prior to 1939 (54.6%). Livingston County has a larger proportion of single family dwellings (72.7%), even more of which were of a vintage prior to 1939 (64.5%). The number of dwellings at Conesus Lake (including Lakeville) is approximately 1,700 (Conesus Lake Association Directory, 1980). Practically all of these dwellings are single family structures, also constructed several decades ago.

Because the flood management plan will alleviate flood problems for Lake residents, the entire SMSA is considered the affected

Table B4 - Housing Units - 1970

C = City T = Town V = Village U = Unincorporated Place	YEAR-ROUND HOUSING UNITS: Percent in Structures with One Housing Unit	Two Housing Units	3-9 Housing Units	10 or more Housing Units	Percent in Mobile Homes	HOUSEHOLDS (OCCUPIED UNITS): Percent by Year Moved in 1965-March, 1970	1950-1964	1949 or Earlier	Percent by Number of Automobiles Available: None	One	Two or More
New York State	40.3	14.6	12.7	31.1	1.3	44.[illegible]	38.0	17.2	34.9	43.7	21.5
Upstate New York[1]	62.4	17.4	11.9	4.9	3.4	43.7	35.8	20.5	15.9	54.5	29.6
Rochester SMSA[2]	65.4	12.6	12.4	6.9	2.6	47.2	34.9	17.9	14.1	52.7	33.2
Livingston County	72.7	9.0	5.9	2.5	9.9	42.0	34.2	23.8	8.6	55.4	36.0
Conesus (T)	80.9	1.4	0.0	0.0	17.7	51.7	15.0	33.3	6.8	55.1	38.1
Geneseo (T)	71.1	6.0	7.2	14.0	1.7	51.1	35.3	13.6	6.9	55.2	37.8
Groveland (T)	90.5	3.9	0.9	0.0	4.8	25.8	52.2	22.0	4.0	43.4	52.6
Livonia (T)	72.7	4.4	6.6	1.5	14.7	43.2	37.6	19.2	6.6	59.4	34.1

[1]Excludes New York City and Nassau, Putnam, Rockland, Suffolk and Westchester counties.

[2]Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book Part 2, 1974.

Table B5 - Households (Occupied Housing Units) - Rent or Value - 1970

C=City T=Town V=Village U=Unincorporated Place	RENTED HOUSING UNITS							OWNER-OCCUPIED 1-FAMILY STRUCTURES					
	Median Contract Rent (monthly)	Median Gross Rent (monthly)	Percentage Reporting Specified Gross Rent					Median Value	Percentage Reporting Specified Value				
			Under $80	$80-99	$100-149	$150-199	$200 or More		Under $15,000	$15,000-24,999	$25,000-34,999	$35,000-49,999	$50,000 or More
New York State	$95	$111	22.3	19.8	32.2	15.4	10.2	$22,500	21.9	37.6	22.8	11.6	6.1
Upstate New York[1]	NA	105	29.4	20.3	33.9	12.4	4.0	17,400	38.1	41.5	13.8	5.1	1.6
Rochester SMSA[2]	NA	129	16.4	13.6	38.0	24.0	7.9	20,300	26.3	42.5	20.8	7.9	2.6
Livingston County	85	112	30.4	16.8	32.3	16.4	4.2	16,800	41.4	39.4	13.7	4.4	1.0
Conesus (T)	89	NA	NA	NA	NA	NA	NA	16,500	44.2	31.2	20.5	2.8	1.4
Geneseo (T)	132	155	16.1	5.0	32.6	32.6	13.6	23,100	14.5	44.4	27.2	10.9	3.1
Groveland (T)	57	97	57.9	10.5	14.7	16.8	0.0	15,300	48.9	32.8	12.9	3.8	1.6
Livonia (T)	111	135	23.5	10.9	28.5	33.4	3.6	18,400	32.9	43.4	15.7	7.3	0.7

[1] Excludes New York City and Nassau, Putnam, Rockland, Suffolk and Westchester counties.

[2] Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1974.

area. The Lake would then be more attractive as an alternative home site. It should be pointed out, however, that there are only limited opportunities for new home construction on the floodplain. There are, of course, opportunities for upgrading, winterizing, or remodeling existing dwellings or for second or third tier construction on upland areas.

Table B3 shows that in 1970, of the 15,088 occupied units in Livingston County, a relatively high percentage (74.8%) were owner occupied. This reflects, in part, a large number of farm dwellings. Similarly, the slightly lower percentage of units with full plumbing and electrical facilities is indicative of the rural nature of most of the county.

According to the Census figures in Table B3, approximately 5% of all occupied units in Livingston County are seasonally vacant; this compares to 2% for the Rochester SMSA and the State of New York and 5% for Upstate New York. It has been estimated that approximately 50% of the residences at Conesus Lake are presently occupied year-round. This number has increased substantially since 1970 as many homeowners at the Lake have winterized their cottages in recent years. This trend has resulted from both a desire to maintain only one residence, and thus avoiding additional taxes, and to take advantage of the improved travel opportunity to be developed after the Genesee Expressway (I-390) to Rochester is opened.

From Table B4 it can be observed that in 1970 there was a relatively high proportion of mobile homes in Livingston County, 9.9%. This compares to only 2.6% in the Rochester SMSA and 1.3% in New York State. It may also be noted that there are very low proportions of multi-family units in Livingston County. The higher percentage of multiple-unit dwellings in Geneseo reflects the group housing facilities at the State University in the Village of Geneseo.

The 1970 Census indicates that in Livingston County 23.8% of the households had not moved in the preceding 20 years. This indicates a relatively stable pattern when compared to the 17.9% for the Rochester SMSA. Within the preceding five years, the percentage of household moves in both the Rochester SMSA and Livingston County demonstrates the same differential - 47.2% and 42.0%, respectively.

The median value of owner-occupied single family dwellings in 1970, as shown in Table B5, was considerably lower in Livingston County than in the Rochester SMSA ($16,800 compared to $20,300). Both of these are lower than New York State, at $22,500. Over 41% of single family structures in Livingston County were valued at less than $15,000, while this figure was represented by 26.3% of the structures in the Rochester SMSA.

The median gross monthly rental was $112 in Livingston County, compared to $129 for the Rochester SMSA and $111 for New york State.

The average household occupancy rate in Livingston County in 1970 was 3.3 persons. A further analysis by the County of Census information indicates that 4.7% of all occupied units were overcrowded (based on an assumption of overcrowding at 1.5 persons per room).

According to an exterior structural survey of housing quality conducted in 1970 by the County Planning Board staff, 35.9% of the housing stock in the county was considered in fair condition (basically sound, but indicating a lack of normal maintenance) and 6.6% was considered to be poor (having major structural problems or in dilapidated condition). Most of the poor or dilapidated housing was located in the southern portion of the County. Livonia was the only town in the Conesus Lake area exhibiting a high percentage of poor quality housing stock. The housing condition ratings for the four towns comprising the Conesus Lake area are summarized in Table B6.

Table B6 - Housing Conditions - Livingston County, 1970

	Good Condition		Fair Condition		Poor Condition	
Town	Number	Percent	Number	Percent	Number	Percent
Conesus	411	55.98	271	36.91	52	7.11
Geneseo	412	58.52	261	37.04	31	4.44
Groveland	313	62.35	165	32.87	24	4.78
Livonia	843	47.31	724	40.63	215	12.06
County Total	8634	57.46	5407	35.99	984	6.55

Source: Livingston County Planning Board, Human Cultural Resources and Housing, 1971.

The Village of Livonia, however, had less than 1% of poor condition housing. The high percentage of older homes, as noted above, is a contributing factor to the number of deteriorating structures reported.

Table B7 summarizes housing characteristics for the 1960-1970 period. From this analysis of Livingston County housing, it may be concluded that:

Table B7 - Comparative Housing Characteristics -- Livingston County

Characteristic	1960 Number	1960 Percent	1970 Number	1970 Percent
TOTAL HOUSING UNITS	13,996	-----	16,845	-----
Over 1 Person Per Room	594	5.0	721	4.8
House Valued at Less Than $5,000*	720	11.6	315	4.1
Rental Units Valued at Less Than $40*	169	5.6	226	6.9
Units Lacking Some or All Plumbing	2,392	17.0	966	6.4
Deteriorating ("Fair"-1970)**	1,612	11.5	5,407	35.9
Dilapidated ("Poor"-1970)	714	5.1	984	6.5

Sources: Census of Housing 1960, 1970
Livingston County Planning Department

*Figures have not been adjusted to reflect inflation.

**Slight difference in the definition of "Deteriorating" as used in 1960 and the "Poor" category used in 1970, account for the high increase in 1970.

- overcrowding conditions increased slightly, probably due to increases in number of apartments and mobile homes.

- average price of houses is difficult to determine due to inflation

- the number of low contract rent units has increased due to the influx of mobile homes for rent

- the number of units which lacked some or all plumbing decreased over the decade

- there was an increase in the number and percentage of homes classified as substandard.

During the 1960-1970 decade the number of mobile homes in the County increased by 300%, as noted above. Most of this growth occurred in the low-density, rural towns, especially in the northern portion of the County.

The distribution of houses and mobile homes in the towns is generally concentrated along highway routes. In the Conesus Lake area this type of strip concentration is found along Routes 20 and 20A, and Reservoir Road.

Housing stock at the Lake varies considerably. There has been no official survey of housing conditions, but the recent tax assessments (at 100% valuation) give some indication of the housing stock, and will be discussed in the following section on the floodplain.

Regional Interdependence

The proximity of Livingston County and of Conesus Lake to the Rochester metropolitan area implies a high degree of interdependence. This can be expressed by discussing the commuting patterns of Livingston County residents, as shown in Table B8. These figures indicate that more people commute to work from Livingston County than commute into it, thus creating a net outcommutation of about 4,800 in 1970. The bulk of the commuters work in Monroe County, which includes Rochester City.

Most workers from Livingston County commute to receive higher earnings and/or to retain skilled or professional jobs they had prior to moving to the County and which are not available there. This trend probably continued into the decade of the 70's, and will do so after the opening of the Genesee Expressway, which will permit easier access to jobs in Rochester and Monroe County.

Table B8 - Place of work for commuters
To and From Livingston County, 1970

Live and work in county	11,576
Live in county, work outside of county	8,365
Work in other counties of SMSA	7,037
Monroe	7,023
Orleans	14
Work outside of SMSA	1,328
Work in county, live outside of county	3,530
Live in other counties of SMSA	666
Monroe	652
Orleans	6
Wayne	8
Live outside of SMSA	2,864
Net outcommutation	-4,835

Source: New York State Department of Labor, 1974, Commutation in New York State, 1960 and 1970.

Commuting patterns are also indicative of other travel patterns, such as those related to shopping and services. While there are adequate facilities for goods such as groceries, household goods, autos and repair services, etc., in the Villages of Livonia and Geneseo, Lake residents must travel to Rochester and Dansville for greater selection or for certain major purchases. Again, it is expected that the expressway may open more shopping opportunities for County residents.

Another measure of economic unity and interdependence of a region is the strength of wholesale trade measured by the wholesale-retail ratio. This ratio is determined by dividing the total sales of mercant wholesalers by retail sales and multiplying the result by 100. The higher the ratio, the stronger the wholesale center. A high ratio indicates that the market served extends beyond the local area. In 1972, the Rochester SMSA had a wholesale-retail ratio of 48, while the ratio for Monroe County was 53, and for Livingston County 47. These figures indicate that Monroe has a slightly broader economic base and services than surrounding counties. The State as a whole which includes New York City, a major wholesaler, had a ratio of 135.

Income

Income, as measured by per capita personal income in current dollars, increased 90% in New York State from 1969 to 1978. As shown in Table B9, the rate of increase for this income figure was higher for all counties in the Rochester SMSA, but none increased to the degree of the U.S. figure, and all but Monroe County are below that level. Per capita income increased 96% in Monroe County and 94% in Livingston County. Per capita income for Livingston County was 34% and 35% below that of Monroe County in 1969 and 1978 respectively, indicating that Livingston County per capita income growth rate was considerably behind that of Monroe County.

Table B10 presents the income of families in the region according to the 1970 Census. The Rochester SMSA ranked above the whole state and upstate areas - $11,850 median family income compared to $10,617 and $10,216 respectively. Livingston County, with a median family income of $10,520, was close to the State figures, but below the Rochester SMSA. The percentage of families with incomes below $10,000 was greater in Livingston County (45.8%) than the Rochester SMSA (31.8%) or the State (46.0%). Approximately 6% of families in Livingston County would have been classified as being at the poverty level. The Federal poverty level is defined differently depending on a variety of conditions.

Table B9 - Per Capita Personal Income
New York State and Rochester SMSA Counties

Location	1969	1978	% Increase 1969-1978	% of U.S. Average	
United States	$3,667	$7,840	114		
New York State	4,328	8,230	90	118	105
Livingston Co.	3,380	6,564	94	92	84
Monroe	4,533	8,891	96	131	112
Ontario	3,778	7,230	91	103	92
Orleans	3,600	6,902	92	98	88
Wayne	3,773	7,331	94	103	94

Source: U.S. Department of Commerce, Bureau of Economic Analysis
Survey of Current Business, Vol. 60, No. 4, April 1980.

Labor Force

Individuals 16 years of age and above in a population who work, want to work, or are looking for work, constitute the labor force. The difference between the labor force and those employed determines the level of unemployment. The processes that encourage individuals to enter the labor force play an important role in the economic health of an area. The 1970 Census reported the Rochester SMSA as having a labor force participation rate of 60.5%, which was higher than any other area in the State. Livingston County was reported at a 57.5% rate, as shown in Table B11. It is notable that Groveland had a very low rate - 28.0% - reflecting the rural character of the town as well as the older population characteristics.

The female labor force has been steadily rising throughout the country since World War II. The female participation rates in New York State, Rochester SMSA and Livingston County were all about 38%. The exception among the towns in the study area was Geneseo, with about 50%, which was attributed to the employment at the State University College.

Employment

Employment in the Rochester area is focused on the manufacturing sector, which in 1970 constituted 38.1% of the employed work force as shown in Table B12. This is a higher proportion than the State as a whole. Other major sectors were: services, 24.7%; trade 18.3%; other (agriculture, mining, finance, insurance and real estate; transportation; communications, public utilities; public administration; and construction) 18.9%. Most of the manufacturing jobs - about 78% - are found in the durable goods firms producing photographic, optical, scientific, and automotive equipment. Jobs in this durable goods manufacture category represent nearly 30% of all employment in the SMSA.

Employment categories for Livingston County reflect the rural nature of the County with 6.6% engaged in agriculture (compared to 2.1% for the SMSA) and only 25.0% in manufacturing, although this is still slightly higher than the State average.

Table B13 presents the 1970 Census data for the percentage of employed persons by occupation group. The farm employment in the County and the professional/service occupations in Geneseo are apparent.

The largest employers and the estimated work force in the Rochester SMSA and in Livingston County are listed in Table B14.

Table B10 - Income of Families - 1970

C=City T=Town V=Village U=Unincorporated Place	Median Income	Number of Families	Income Groups - Percentage of Families							
			Under $3,000	$3,000 -4,999	$5,000 -6,999	$7,000 -9,999	$10,000 -14,999	$15,000 -24,999	$25,000 -49,999	$50,000 or More
New York State	$10,617	4,584,616	8.2	8.3	10.6	18.9	27.5	19.7	5.6	1.2
Upstate New York[1]	10,216	1,618,448	7.4	8.1	11.2	21.8	30.1	17.3	3.5	0.6
Rochester SMSA[2]	11,850	236,346	5.6	6.2	8.1	16.9	32.5	24.6	5.3	0.8
Livingston County	10,520	12,437	6.0	7.8	10.4	21.6	32.8	18.2	3.0	0.3
Conesus (T)	8,644	365	5.9	15.3	10.6	36.3	19.4	12.5	0.0	0.0
Geneseo (T)	11,845	1,134	4.0	3.8	7.4	20.6	34.7	23.2	5.8	0.5
Groveland (T)	11,786	336	3.4	2.1	6.2	25.4	23.3	32.1	7.5	0.0
Livonia (T)	10,465	1,353	3.5	8.1	13.0	21.7	29.7	18.7	5.4	0.0

[1] Excludes New York City and Nassau, Putnam, Rockland, Suffolk and Westchester Counties.

[2] Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1974.

[illegible] Labor Force - [illegible]
Population 16 Years [illegible] and Over

C=City T=Town V=Village U=Unincorporated Place	Number	Percent in Labor Force	Total	Female Number	Female Percent	Civilian Labor Force: Employed Workers: Number	Private Wage and Salary Workers (Percentage of Total)	Government Workers (Percentage of Total)	Self-Employed Workers (Percentage of Total)	Unpaid Family Workers (Percentage of Total)
New York State	13,[illegible]29,2[illegible]	[illegible].3	7,421,8[illegible]	2,878,[illegible]27	3[illegible].[illegible]	[illegible],1[illegible]4,[illegible]	76.[illegible]	16.8	[illegible]	[illegible].3
Upstate New York[1]	4,582,7[illegible]	57.[illegible]	2,[illegible]11,722	991,1[illegible]6	38.[illegible]	2,4[illegible],761	7[illegible].4	17.[illegible]	6.[illegible]	[illegible].5
Rochester SMSA[2]	662 337	60.5	40[illegible],37[illegible]	15[illegible],197	38.8	386,150	80.7	13.[illegible]	5.7	[illegible].3
Livingston County	37,536	57.5	21,621	8,577	39.7	20,[illegible]75	64.0	26.2	8.8	1.[illegible]
Conesus (T)	972	53.[illegible]	422	147	34.8	404	61.[illegible]	22.[illegible]	13.[illegible]	[illegible]
Geneseo (T)	5,943	52.	3,[illegible]9[illegible]	1,557	50.3	3,054	39.6	54.3	[illegible].5	[illegible].6
Groveland (T)	2,352	28.0	7[illegible]9	279	39.4	687	49.5	38.1	3.[illegible]	[illegible]
Livonia (T)	3,55[illegible]	61.3	2,158	739	37.0	2,076	74.7	15.3	10.1	[illegible]

[1]Excludes New York City and Nassau, Putnam, Rockland, Suffolk, and Westchester Counties.

[2]Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1974.

Table B12- Industry Groups - Percentage of Employed Persons, 1970

C=City T=Town V=Village U=Unincorporated	Number Employed	Manufacturing Total	Manufacturing Durable Goods	Manufacturing Non-durable Goods	Whole-sale Trade	Retail Trade	Agri-culture	Min-ing	Con-struc-tion	Business Repair Services	Person Service
New York State	7,124,001	24.2	12.9	11.3	4.4	15.1	1.3	0.2	4.8	4.1	4.0
Upstate New York[1]	2,496,761	30.7	21.4	9.3	3.5	15.5	2.8	0.3	5.6	2.4	3.7
Rochester SMSA[2]	386,150	38.1	29.7	8.4	3.3	15.0	2.1	0.2	5.1	2.3	2.8
Livingston County	20,775	25.0	16.5	8.5	3.1	15.1	6.6	1.5	6.3	1.5	2.7
Conesus (T)	404	39.1	26.0	13.1	2.0	6.2	8.9	0.0	11.9	0.0	4.5
Geneseo (T)	3,054	9.2	5.2	4.0	1.3	15.6	2.8	1.3	2.8	0.9	2.5
Groveland (T)	687	21.5	12.7	8.9	2.2	10.0	20.1	3.2	2.2	1.3	0.9
Livonia (T)	2,076	26.1	21.5	4.6	5.2	17.1	4.9	0.3	9.0	2.4	3.4

[1] Excludes New York City and Nassau, Putnam, Rockland, Suffolk, and Westchester Counties.

[2] Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1974.

Table B12 (cont.) - Industry Groups - Percentage of Employed Persons, 1970

C=City T=Town V=Village U=Unincorporated Place	Professional, Related Services			Entertainment and recreation	Finance, Insurance, Real Estate	Transportation, Communications, Utilities				Public Administration
	Total	Hospitals	Educational			Total	Transportation	Communications	Utilities	
New York State	19.8	4.0	8.2	1.1	7.5	8.1	4.5	1.8	1.8	5.5
Upstate New York[1]	20.2	4.1	9.8	0.6	3.8	5.7	3.0	1.3	1.5	5.2
Rochester SMSA[2]	19.0	3.5	9.3	0.6	3.6	4.5	1.9	1.1	1.4	3.3
Livingston County	27.6	3.1	15.6	0.3	1.7	5.0	2.4	1.3	1.4	3.7
Conesus (T)	17.8	0.7	6.9	0.0	0.0	1.5	1.5	0.0	0.0	8.2
Geneseo (T)	53.8	0.6	44.9	0.5	1.1	4.0	1.8	1.0	1.2	4.2
Groveland (T)	30.7	4.1	9.6	0.9	1.6	2.2	2.2	0.0	0.0	3.2
Livonia (T)	18.2	1.9	7.3	0.6	2.3	6.9	2.8	1.6	2.5	3.6

[1] Excludes New York City and Nassau, Putnam, Rockland, Suffolk, and Westchester Counties.

[2] Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1974.

Table B13 - Occupation Groups - Percentage of Employed Persons - 1970

C=City T=Town V=Village U-Unincorporated Place	Number Employed	Professional, Technical Workers	Farmers, Farm Managers	Managers, Administrators (exc. farm)	Clerical Workers	Sales Workers	Craftsmen, Foremen	Operatives	Service Workers: Private Household	Service Workers: Other	Laborer (inc. farm foremen
New York State	7,124,001	16.7	0.6	8.5	22.4	7.5	12.2	15.1	1.1	11.9	4.0
Upstate New York[1]	2,496,761	16.4	1.4	7.4	17.8	6.6	14.2	18.0	0.9	12.1	5.0
Rochester SMSA[2]	386,150	17.8	1.0	7.2	18.7	6.5	14.6	18.4	0.7	10.9	4.2
Livingston County	20,775	15.0	3.5	6.0	16.0	5.5	14.2	16.7	1.2	15.4	6.6
Conesus (T)	404	16.6	7.9	3.0	13.6	1.7	20.5	17.6	0.0	12.6	6.4
Geneseo (T)	3,054	20.4	1.2	6.5	23.2	4.8	7.9	7.1	2.5	22.6	3.8
Groveland (T)	687	17.5	8.0	7.6	9.5	5.8	9.0	13.1	0.0	14.0	15.6
Livonia (T)	2,076	17.5	3.1	5.4	12.7	7.1	15.4	18.9	1.6	12.1	6.2

[1] Excludes New York City and Nassau, Putnam, Rockland, Suffolk, and Westchester Counties.

[2] Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1974.

Table B14 - Major Manufacturing Firms
Monroe and Livingston Counties

Firm	Estimated Employees-1980
Monroe County	
Bausch & Lomb, Inc.	4,500
Burroughs Corporation	1,000
Case-Hoyt Corp.	900
Eastman Kodak Co.	52,000
Gannett Co., Inc.	1,500
General Electric Co.	1,000
General Motors Corp.	
Delco Division	3,200[1]
Rochester Products Division	4,300
General Railway Signal Co.	1,600
Genesee Brewing Co.	700
Hickey-Freeman Co., Inc.	1,100
Pharmaceutical Division (Pennwalt Corp.)	1,200
R.F. Communications	1,000
Sybron Corp. (incl. Taylor Instruments)	3,950
Xerox Corp.	16,000
Livingston County	
Champion Products, Inc.	180
Chloride Electro Networks	550
Curtis Foods, Inc.	360[2]
Dubois Plastics	90
Foster Wheeler Corp.	1,200
General Foods (Birdseye)	300[2]

Table B14 (cont.)

Firm	Estimated Employees-1980
International Salt Co.	300
Jones Chemicals	60
Joslyn Manufacturing & Supply Co.	210
Lucidol Div. of Pennwalt Corp.	180
Specialized Printed Forms	240

[1]Not presently at this level.

[2]Seasonal

Source: New York State Department of Commerce, Rochester Regional Office, 1980.

Unemployment

Table B15 presents unemployment statistics for the State, the Rochester SMSA, and the counties in the SMSA. These figures are reported by the NYS Department of Labor.

The Rochester SMSA has consistently shown lower unemployment rates than New York State as a whole. The Rochester area, with its large manufacturing sector exhibited high unemployment during the economic downturn in 1975-1976 and is continuing to recover. There were some permanent job losses with the closing of the Stromberg-Carlson facility and a major men's clothing manufacturer.

Monroe County was relatively less affected by the economic slowdown than the State and other counties in the region and continues to demonstrate lower unemployment rates. This is attributable to the nature of the type of industries located in the County for which there is high demand for products, such as photographic equipment, optical equipment, reproduction equipment, etc. These industries tend to be more stable, and in fact have been experiencing growth. In addition, while the labor force has grown rapidly, the development of new employment opportunities has also grown with 3200 new jobs created last year in the Rochester Area (Rochester Area Chamber of Commerce). In 1980 there were considerable layoffs at the General Motors plants in Rochester, but many workers were back by late summer.

Many of the highly skilled workers in the area are able to transfer these skills among different jobs. While there is an influx of new, unskilled workers into the labor force, there are various training programs to upgrade these skills.

The Rochester area is an Economic Development District (EDD) under the Economic Development Administration (EDA) with one goal of expanding employment opportunities in the District by assisting existing industries, by assisting industrial development groups to attract new business and industry, and by assisting local business in efforts to diversify. Similarly, the Rochester Chamber of Commerce is seeking to maintain and upgrade existing job markets.

Unemployment in Livingston County generally parallels Monroe County, although the rates of change were a little less severe and in 1979 was second to Monroe County.

Commerce and Manufacturing

The importance of industry, especially manufacturing, to the Rochester SMSA has been noted in the preceding discussion of

employment. Table B16 shows the distribution of manufacturing by industry type in the Rochester SMSA according to the 1977 Census of Manufacturers. The value added by manufacture figure represents 15.2% of the New York State total. This figure indicates the net effect of the highly labor-intensive industries in the region, such as office equipment, measuring instruments and electrical equipment. Manufacturing in Livingston County comprised a relatively small portion of the total.

Retail sales in the Rochester SMSA represents only about 6% of the State total. This is a bit higher than the proportion or the population, indicating a higher per capita expenditure for consumer goods and services. Livingston County has an even smaller share of retail sales, indicating that residents do shop elsewhere. There are several regional shopping centers within easy reach of Conesus Lake residents; these will be even more accessible with the opening of the Genesee Expressway. Table B17 is a summary of retail sales information from the 1972 Census of Retail Trade.

Agriculture

Historically, the Rochester area played a vital role in the agricultural production of upstate New York. In the 19th century, milling was one of the major industries in the Rochester area, supplying flour and other products to the rest of the nation. However, as the western U. S. became the prime wheat farming area, the industry in Rochester shifted to production of technical goods, as noted above. The surrounding counties remained primarily agricultural, with Livingston County being a leader in this sector.

The County contains vast areas of prime farmland especially in the upland areas surrounding Conesus Lake, most of which has been in productive use. However, as in all parts of the country, there has been some decline in farming in the last 25 years. The Livingston County Planning Board staff prepared an extensive analysis of agricultural lands as part of the comprehensive planning process in the early 1970's. These figures showed:

Period	Percentage Decline in Farm Acreage
1954-1959	9.8
1959-1964	10.6
1964-1969	3.3

This also shows that the rate of decline was decreasing in the last period. The average size of farms, according to the

Table B15 - Unemployment Rates
1974 - 1979 Annual Averages

	Annual Average Unemployment Rate (%)					
	1974	1975	1976	1977	1978	1979
New York State	6.4	9.5	10.3	9.1	7.7	7.1
Rochester SMSA	3.9	7.5	8.2	7.1	5.9	5.2
Monroe County	3.5	6.8	7.3	6.5	5.3	4.7
Livingston County	4.0	7.5	8.7	7.3	6.6	5.9
Ontario County	5.0	9.3	11.0	8.8	7.1	6.5
Orleans County	6.1	9.8	9.7	8.1	7.4	6.9
Wayne County	4.9	10.5	11.9	9.6	8.3	7.1

Source: New York State Department of Labor, Bureau of Labor Market Information, Division of Research and Statistics, 1980

Table B-16 - Statistics by Manufacturer: 1977 and 1972

Geographic Area	Sic Code	Manufacturing Industry	Total Number of Establishments	All Employees (1000)	Value Added by Manufacture (Million Dollars)	Value of Shipments (Million Dollars)	All Employees (1000)	Value Added by Manufacture (Million Dollars)
			1977				1972	
New York State			36,578	1,509.9	44,289.8	86,216.4	1,679.3	30,403.5
Rochester SMSA		All Manufacturing Industries	1,316	144.4	6,732.4	9,735.1	142.2	4,390.6
	20	Food and Kindred Products	125	6.9	323.7	769.0	8.8	263.2
	26	Paper and Allied Products	41	3.1	68.9	172.5	3.1	57.2
	27	Printing and Publishing	217	6.9	188.1	280.4	6.8	127.7
	28	Chemical and Allied Products	40	2.4	134.3	227.4	2.1	76.2
	30	Rubber and Miscellaneous Plastic Products	40	2.0	54.1	92.5	3.0	49.3
	32	Stone, Clay, and Glass Products	57	3.0	84.9	143.3	2.2	42.2
	33	Primary Metal Industries	25	.9	24.0	56.8	1.0	18.0
	34	Fabricated Metal Products	148	7.0	238.4	378.5	7.2	144.9
	35	Machinery, Except Electrical	261	16.4	563.4	821.8	13.8	310.6
	36	Electric and Electronic Equipment	68	11.8	388.7	594.2	11.9	232.6
	38	Instruments and Related Products	72	65.2	4,481.5	5,882.0	(N/A)1/	(N/A)1/
	39	Miscellaneous Manufacturing Industries	48	3.0	75.9	131.6	2.9	52.0
Livingston County			56	3.9	158.3	227.0	4.3	107.0

1/ Not Available.

Source: New York State 1977 Census of Manufacturers

Table B17 - Retail Sales

Location	Number of Retail Establishments	Sales (Total $000) 1972	Sales (Total $000) 1967
New York State	158,152	39,173,270	29,091,471
Upstate New York [1]	60,840	14,258,960	10,402,008
Rochester SMSA [2]	7,328	2,233,250	1,635,688
Livingston County	550	92,314	68,208

[1]Excludes New York City and Nassau, Putnam, Rockland, Suffolk and Westchester Counties.

[2]Livingston, Monroe, Ontario, Orleans and Wayne Counties.

Source: Rochester Area Business Fact Book, Part 2, 1976.

1969 Census of Agriculture changed from 262 acres in 1964 to 240 acres in 1969. But by 1974, approximately 65% of the County was in agricultural use, as shown in Table B18, indicating a reversal of the downward trend in agricultural land uses. Table B19 presents the relative position of Livingston County to the rest of the region with respect to agricultural use. It is clear that Livingston County had a highly concentrated employment of land in agriculture.

Approximately 65% of these farms were dairy farms in 1969. The Towns of Geneseo and Livonia were classified as having "high intensity" agricultural use, Groveland was "medium intensity", and Conesus was "low intensity" according to Livingston County planners. There is a high potential for agricultural land use in Livingston County, however, some of the prime land has already been developed for other uses. The County has designated ten Agricultural Districts in accordance with New York State conservation efforts. The Agricultural Districts generally coincide with the areas of prime farmland.

Recreation and Open Space

Being a natural Finger Lake, Conesus Lake is itself a major recreational site. Historically it was a place where people from Rochester and Buffalo could easily travel for a day's outing. Rail and boat transportation was available between Conesus Lake and both of these cities. Cottages were also built and people could enjoy the lake during the summer, and eventually many winterized their homes so they could live there all year round. Because of the riparian laws of New York State, however, as homes were built around the periphery of the Lake and the lodges and tent grounds were replaced by private homes, public access to the lake has been limited. Today the public can utilize the State boat launching dock on the east side of the lake near Lakeville and can enjoy the public lake access at Long Point, where there are also amusement facilities and food concessionnaires in the summertime. In the winter the public may use the lake for ice fishing, skating and snowmobiling. (A more detailed discussion of recreational facilities at Conesus Lake is presented in the following section.)

The entire Finger Lakes region is an alternative for recreation use, however, since Hemlock Lake is a reservoir for the City of Rochester, it is not available to the public except for fishing. Honeoye, another of the small Finger Lakes, is developed similarly to Conesus Lake, although it is smaller. Canandaigua, a major Finger Lake, is further removed from the area and does have a variety of public facilities. The remainder of the major Finger Lakes offer a wide variety of activities.

The region is rich in recreational opportunities including the resources of Lake Ontario, the numerous city parks in Rochester, and the State Parks, Letchworth and Stony Brook. The major recreational activities and their locations are summarized in Table B20.

As part of the comprehensive planning process, the Livingston County Planning Board prepared a Parks, Recreation and Open Space Plan which, however, has not been officially adopted. The plan contains several elements such as establishment of a county parks system, a trail system, a bikeway and bike trails system; promotion of additional game and wildlife preserves, additional wetlands acquisition by NYSDEC; and creation of a Genesee River Green Belt.

Land Use

An existing generalized land use map for the Conesus Lake drainage basin is presented in Figure B3. This map is derived from the New York Land Use and Natural Resource (LUNR) mapping and portrays the generalized uses as observed in 1968. More detailed studies of Livingston County land use maps indicate the overall accuracy of the LUNR map. It is apparent that for the area covered by the map, the residential concentrations are located around the lake perimeter and in the Village of Livonia and the scattered hamlets in the Towns of Livonia, Conesus, and Groveland.

This map does not extend to the Village of Geneseo, nor does it show the population concentrations along the roadways leading to Geneseo.

Much of the area is still agricultural, as discussed above. Some of the forested areas are suitable for development; others, because of steep slopes (especially in Conesus), or County policy, might not be suitable for development.

There is an adopted County comprehensive land use plan which is intended to guide the growth and development in the County. Each town in the vicinity of Conesus Lake also has adopted zoning ordinances which limit the kind of development that can occur in a given area. The zoning in the vicinity of the of the Lake generally permits one or two-family units on the lake shore and on the land side opposite the road (each town has different zoning classifications).

The future effects of growth due to the Genesee Expressway, as well as the flood management plan, will be discussed below.

Table B18 - Agricultural Land Use
Livingston County: 1964-1974

	1964	1969	1974	% Change 1964-1974
Acres in farms	257,696	249,290	267,329	3.7
Percent of land in farms	63.0	61.0	65.4	3.8
Acres of:				
Cropland harvested	127,900	113,755	145,603	13.8
Cropland in pasture	29,337	29,941	25,437	-13.3
Other cropland	22,119	34,599	17,250	-22.0
Woodland including woodland pasture	38,553	39,019	36,640	-5.9
Other pasture	39,792	31,976	42,399	6.6

Source: U.S. Census of Agriculture; Livingston County, 1964, 1969, 1974.

Table B19 - Absolute and Relative Quantity of
Extensive Agriculture by County
Genesee/Finger Lakes Region: 1968

	Acres	Percent of County in Extensive Agriculture	Percent by County of All Extensive Agriculture	County Area as a Precent of Region	Index of Concentration*
Genesee	148,154	46.7	12.8	11.6	110
Livingston	221,688	54.4	19.2	15.0	127
Monroe	149,278	34.3	12.9	15.9	81
Ontario	195,851	46.4	16.9	15.5	109
Orleans	122,799	48.0	10.7	9.3	113
Seneca	116,505	45.3	10.1	9.3	107
Wayne	120,530	30.3	10.5	14.6	71
Yates	80,807	35.7	6.9	9.3	74
G/FLR	1,155,613	N/A	100.0	N/A	100

*The Index of Concentration in the last column of the table is a measure of the importance of a use of land in the county as measured against the size of the county relative to the region. If the index for a county exceeds 100, it means the county contributes a larger percentage of its land to the particular use in relation to its share of the total size of the region.

Source: Land Use Regional Inventory and Analysis; Genesee/Finger Lakes Regional Planning Board; December, 1970, page 42, as shown in Agricultural Land Resources and Conservation Areas, Livingston County Planning Board, June, 1972.

Table B20 - Recreational Activities in Affected Area

	Cabins	Tents/Trailers	Picnicking	Swimming	Boat Launching	Fishing	Hiking	Golf	Snowmobiling	Skiing	Hunting	Playfields
<u>State Parks</u>												
Stony Brook State Park		X	X	X			X		X	X		X
Letchworth State Park	X	X	X	X		X	X		X	X		X
<u>Municipal Parks</u>												
Douglas Welch Mun. Pk(Livonia)			X									X
Sandy Bottom Park (Honeoye)		X	X	X								X
Ambuscade (Groveland)			X				X					X
<u>Hunting Grounds, Livingston Co.</u>												
Conesus Inlet										X		
Rattlesnake Hill										X		
Hemlock Lake						X						
Canandaigua Lake	X	X	X	X	X	X	X	X	X	X		

Source: Finger Lakes Travel Guide, Finger Lakes Association, 1980.

Transportation

The region is well served by a network of Interstate highways, State and County roads. Conesus Lake is served by State Routes 15 and 256 in the north-south direction and by Route 20A on the north of the lake for east-west travel. This latter route is a main connector between Geneseo and Livonia. Lake residents are also served by East Lake Road (County Route 8), running north-south along the lake and by Reservoir Road to the west. Route 15 is presently the primary access route to Rochester; it is a two-lane facility to the vicinity of West Henrietta, then it widens to four and six lanes.

Route 15 also provides access to the New York Thruway (I-90) at Exit 46, about 16 miles from Lakeville. The interstate spur (I-390), the Genesee Expressway, is presently under construction with the first section from Avon (Route 5/20) to the connection at Clay Road just opening in October of 1980. The section from Avon to 20A is expected to open in the spring of 1981 and the last portion, which will extend to the Southern Tier Expressway, is planned for opening in 1982. The general alignment for this facility is shown in Plate 1. The interchange at S.R. 20A is located approximately 1 1/4 miles from Conesus Lake, and it is estimated that commuter travel times on this link will be greatly reduced to Rochester.

Rochester is served by two major rail freight lines - the Chessie System and ConRail. The Livonia, Avon, and Lakeville Railroad formerly handled corn syrup and sugar shipments to and from the sugar syrup processing company at Lakeville, as well as excursion trips of summertime passengers. The passenger trips were discontinued in 1978 and the line now only makes one trip per day to supply the sugar processing plant. Rail passenger service from Rochester is provided by AMTRAK to Boston, Chicago and New York.

The Rochester Monroe County Airport is conveniently located about 25 miles north of Conesus Lake. Three commercial airlines serve the airport.

Waterborne traffic is served by Lake Ontario with access to ocean-going vessels and other Great Lakes Ports, and by the New York State Barge Canal.

Summary

The preceding discussion describes the various elements that comprise the socioeconomic and land use factors of the region surrounding Conesus Lake. It is essential that all factors be considered in order to form a total view of the area;

however, for purposes of analysis the affected area which will result from the flood control plan at Conesus Lake is limited due to the unique nature of the flood plain. Therefore, factors of concern for the affected area (the Rochester SMSA) include population, housing, and recreation. The effects of the Genesee Expressway will probably be more significant, but cannot be fully addressed in this analysis.

FLOODPLAIN CHARACTERISTICS

This section describes the physical features, infrastructure, and services in the Conesus Lake floodplain.

INHERENT CHARACTERISTICS OF THE FLOODPLAIN

Boundaries

The floodplain is bounded by the lake perimeter to include development along the lake. For purposes of this discussion the area bounded by the Millville Dam on the north, the lake perimeter roads on the east and west - East Lake Road and West Lake Road (Route 256), and Sliker Hill Road on the south. This area is expanded to include the development on the immediate upland side of the roads for discussion of housing, infrastructure, and services. A detailed land use map of the area in which the channelization will occur on the outlet is shown in Figure B4.

Flooding

Conesus Lake, a natural Finger Lake, has had a long history of flooding. Its natural beauty and accessibility attracted holiday seekers throughout the 19th century. The lake is fed by a system of streams - Conesus Inlet and the North and South McMillan Creeks. These streams carry the runoff from higher elevations; frequently during years of excessive snow melt in the winter or spring or during unusual storms, such as Hurricane Agnes in 1972, the Conesus Outlet is unable to handle the increased water levels, causing the lake to flood. Some of the problem results from the accumulation of silt and debris at the outlet, which the Conesus Lake Association and the four towns at the lake had dredged in 1978.

The flooding history is described in detail in Appendix A. The worst floods occurred in March 1956 and June 1972 (Hurricane Agnes) when there were peak elevations of 822.07 feet and 822.50 feet, respectively; approximately 1,300 cottages and homes were affected during these incidents. Other major flooding occurred in 1936, 1954, and 1960. Flooding damage will normally occur at a level of about 819.5 feet. There are also occasions in the late summer, when runoff is least and there are greater demands on lake water, that the lake level drops excessively (below 816 feet), causing problems for boat launching, fishing and wetland activities at the north end of the lakes.

Floodway and Natural Storage

Flooding results principally from insufficient outlet capacity of the existing control structure which precludes lowering the

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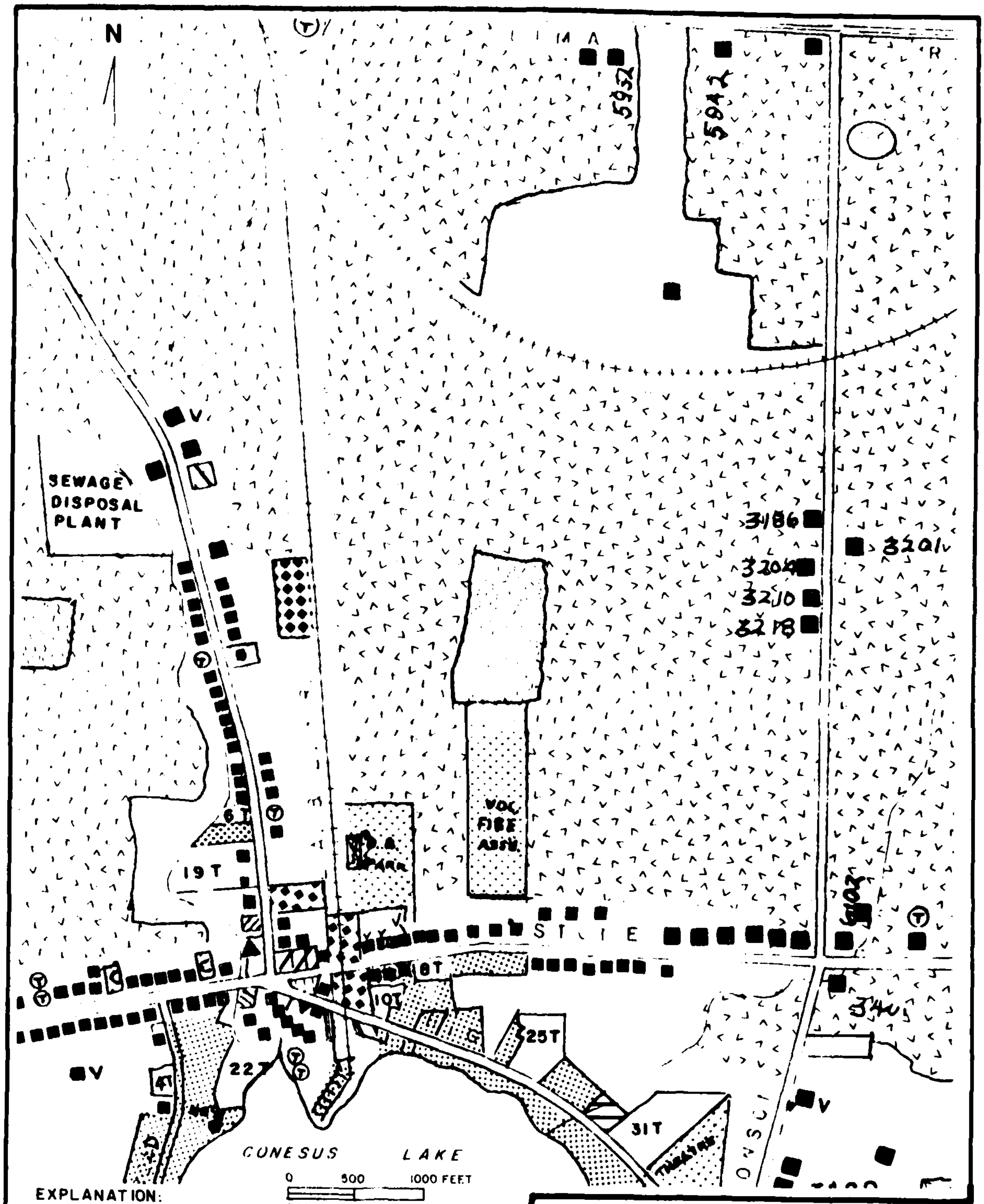


EXPLANATION:

- RESIDENTIAL 1 FAMILY
- RESIDENTIAL 2 FAM
- MOBILE HOME
- PUBLIC & SEMI-PUBLIC
- COMMERCIAL
- INDUSTRY
- FOREST
- AGRICULTURE
- WETLAND
- RES. MULTI-FAM.
- OTHER OPEN SPACE
- V VACANT

REFERENCE: TOWN OF LIVONIA, LAND USE MAP

CONESUS LAKE, NEW YORK

CONESUS OUTLET LAND USE

U.S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE B-4

lake sufficiently each winter to provide storage capacity below damaging levels. If lake levels could be lowered further between October and February there would be sufficient storage capacity in the lake. Stop logs in the existing control structure are removed by October 15 each year; however, this often does not bring the lake levels down sufficiently prior to the spring runoff. In addition, the existing outlet becomes clogged with silt, brush, and other debris. The dredging noted above was not a permanent solution to the problem. Frequently also, ice damage to docks, abutments, and natural features is significant. More detailed discussion of the floodway and storage may be found in Appendix A.

Natural Features

Conesus Lake, a former stream valley, was formed from glacial activity. To the north, the Conesus basin is fairly flat, but becomes more steeply sloping with higher elevations toward the middle of the lake. As with other Finger Lakes, the highest elevation is at the south end near the inlet streams. The lake is approximately 7.8 miles long, about 1 mile wide at the southern end and covers an area of about 5 square miles. The total drainage basin encompasses about 76 square miles. The greatest depth is about 70 feet.

Vegetation

The vegetation of the project area consists of oak-sugar maple association in the higher plateaus grading to red maple on the lower slopes and swamp male in the low lying areas. Most of the natural vegetation near the shore has been replaced by lawns and various introduced ornamental species, the notable exceptions being a stand of burr oak near the middle of the lake on the west shore, small undisturbed bog woods on the nrothwest shore, and the wetland area on the southern end of the lake. (Forest et. al., 1978).

Fisheries

The lake, as well as its inlet and outlet, supports populations of walleye, northern pike, and various centrachids (sunfish and bass). The walleye population exists naturally in the lake but has been supplemented in the past by stocking. The centrachids, which spawn around the lake's perimeter, are a natural population. The most important fishery of the lake, from a recreational perspective, is the northern pike. This large warm water species extensively uses the wetland surrounding the lake's inlet as a spawning area; as such, the lake supports a large natural population of northern pike (White, 1980).

Waterfowl and Wildlife

The water fowl population of the lake is relatively small. The lake serves mainly as a refuge for local birds, principally mallards and as a stopover area for small groups of migratory waterfowl during brief periods in the fall. The lake also supports a limited population of furbearers. Mink have been observed in the lake inlet and south McMillan Creek. Muskrat, raccoon, opossum and skunk have also been seen in the general area of the lake (White, 1980).

Transportation

Conesus Lake and its inlet and outlet streams do not provide any navigable waterways. The only transportation is that for recreational boat usage. The overall transportation system for the affected area is described above. The roadways that border the floodplain - Route 256, Routes 20A and 15, and the East Lake Road (County Road 8) are generally above flood level and are not subject to flood damage. The road at the south end, Sliker Road, does have a propensity to flood during high water periods.

PHYSICAL CHARACTERISTICS

A description of the physical characteristics of the floodplain, such as the slope, soil types, water table, etc., appears in the technical discussion, Appendix C.

AVAILABLE SERVICES

Transportation

The major transportation facilities serving the Conesus Lake area have been discussed under the economic base for the affected area. The critical aspect to the residents of the floodplain will be the effect of opening the interstate link between Dansville in Livingston County and Rochester, the Genesee Expressway (I-390). The potential effects will be discussed in the section on land use changes. It is highly probable, however, that the advent of this facility will increase the attractiveness of the Conesus Lake area and the adjacent developable land area in the towns of Livonia, Geneseo, and Groveland significantly. A similar pattern has already emerged in the I-490 corridor to the north and east of Conesus Lake where eastern Monroe County has experienced growth, and in northern Ontario County (where taxes are somewhat lower).

Facilities and Services

Power and Communications

Electricity is provided to Conesus Lake primarily by Niagara Mohawk Power Corporation, which serves the Towns of Conesus,

Groveland, Genesee (northern part) and Livonia. Rochester Electric Corporation provides electric power to the Village of Geneseo. Other areas of the County are served by New York State Electric and Gas Corporation (NYSEG). Natural gas is supplied to Livingston County by NYSEG, Rochester Gas and Electric Corporation, and Pavilion Natural Gas. The Conesus Lake area is served by NYSEG and Pavilion Natural Gas. Propane gas is used for some home heating. The Rochester Telephone Corporation provides telephone communications to the area.

Water Supply

Conesus Lake serves as the water source for several Livingston County communities. The Villages of Avon and Geneseo; the hamlets of Lakeville, East Avon, Retsoff, and York; and individual households surrounding the lake all rely on Conesus Lake for water supply. Avon, Geneseo, and Lakeville maintain their own pumping facilities on the lake; both Avon and Geneseo are authorized to withdraw a maximum of 3 mgd. East Avon and the York complex purchase water from Avon and Geneseo, respectively. Table B21 shows the NYS Department of Environmental Conservation's estimates of water supply requirements for the area.

Sewage Treatment

Until the early 1970's, lake residents used private means of sewage disposal, with much of the waste material seeping into the lake from outhouses, cisterns, package facilities, etc. The farmers also used the lake to water their animals. This became a serious problem in view of the fact that the lake was the drinking water supply to Avon and Geneseo. As the lake community grew, so did the sanitary problem, and by 1969 the residents of the towns of Conesus, Geneseo, Groveland, and Livonia, as well as the Village of Livonia, voted to form and to issue bonds for the Conesus Lake County Sewer District under the Conesus Compact. The purpose of the sewer district was to build and operate a perimeter sewer to serve the residents of Conesus Lake (including those away from the lake shore and in Lakeville), and of the Village of Livonia. The sewage treatment facility, located about a quarter of a mile from the lake on Conesus Outlet, began operating in October 1972. It serves approximately 1900 residences at the lake and 400 in Livonia. It is an advanced waste treatment (tertiary treatment) plant, currently with a volume of .58 to .60 mgd. The design capacity is about double that amount, or 1.27 mgd. The plant requires a minimum creek flow of 10 cfs for peak operation. New users must pay for their own sewer connections and are billed on a unit basis.

Table B21 - Water Requirements

Community	Population 1990	Population 2020	Demand - MGD 1990 Average Daily	Demand - MGD 1990 Peak	Demand - MGD 2020 Average Daily	Demand - MGD 2020 Peak
Avon Complex	5,800	9,200	2.22	3.33	3.38	5.06
Lakeville	2,400	2,800	0.30	0.45	0.35	0.53
Conesus Lake Communities	10,200	16,000	1.02	1.53	1.60	2.40
Geneseo	13,500	22,000	1.81	2.72	3.46	5.19
York Complex	3,050	4,600	0.48	0.73	0.83	1.24
Total	34,950	54,600	5.38	8.76	9.62	14.42

Source: New York State Department of Environmental Conservation.

Solid Waste

Disposal services pick up trash on a contract basis; some lake residents transport trash and other waste products to nearby refuse disposal sites in Livingston County.

Services

Health

The nearest hospitals to Conesus Lake residents are located in Rochester (3), Dansville, Warsaw (Wyoming County), and Canandaigua. Other health services provided in Livingston County include the County Infirmary in Geneseo, a State school for the mentally retarded, an outpatient psychiatric clinic, a day training center for the mental health department, and three nursing homes. There are several social assistance services such as family planning, alcoholism information, etc., in Geneseo and Mt. Morris.

Law enforcement is under the jurisdiction of the County Sheriff, headquartered in Geneseo. The boat patrol initiated by the Conesus Lake Association is also handled by the Sheriff's department. The Conesus Lake Association has noted that lake perimeter residents are concerned with the number of traffic violations on East Lake Road. In a Livingston County Traffic Accident Survey of 1972, the crossroads of New York State Route 256, and U.S. Route 20A, just outside of Lakeville had the heaviest concentration of accidents. There were at least three fatalities in the immediate lake area, as well as numerous accidents that did not result in loss of life. In 1979 there were only two significant boating accidents, with no injuries. There were 192 navigation complaints with reckless navigation, the most frequent complaint, and excessive noise, the second pressing concern. (Livingston County Leader, Wednesday, 23 April 1980).

The Conesus Lake Association has also initiated a neighborhood watch program to help protect permanent, seasonal, and weekend properties on the perimeter from theft and vandalism.

Fire service is provided by the Groveland, Geneseo, Conesus, Livonia, and Lakeville Fire Departments and has been described as excellent service by a Conesus Lake Association representative. Ambulance service is provided by Livonia and Geneseo. Lakeville also has a rescue boat and handles ice fishing accidents.

Commercial

There is very little commercial activity on the perimeter of Conesus Lake, with the exception of the hamlet of Lakeville. There are a few general stores located on Route 256 and East

Lake Road. These are convenience stores, some with gasoline pumps, open limited hours to serve the local population. Most year-round and summer residents shop for food and personal needs at the nearby stores in Lakeville, Livonia and Geneseo. There are several restaurants and inns around the lake perimeter which are used not only by lake residents, but also by people from Rochester and other nearby areas. The major commercial activity at the lake is boating, marine, and sports equipment suppliers.

In the past, there were some small-scale processing industries, such as ice cutting, peat processing, lumbering and sawmills, grist milling and grain elevators, potash fertilizer production, milk processing, and chicken production. These were located in Lakeville. The only present industries are a sugar syrup plant and a small foundry. There is also a scattering of service stations, taverns, restaurants, a bowling alley, drive-in theater, and miscellaneous services. Some of these are actually located in the floodplain, particularly along the Conesus Outlet.

Livonia provides a good range of small stores and other services including printing, new car sales, etc. Geneseo and Avon have an even larger commercial base. The hamlets which surround the lake - South Livonia, Conesus, Scottsburg, Websters Crossing - have very little commercial activity. Major shopping and business services are obtained from Dansville and the Rochester metropolitan area.

Parks and Recreation

Conesus Lake is itself a major recreation center for the Rochester area. It has been estimated that the peak weekend summertime population at the lake swells to over 10,000. The residential occupancy is about 6,000, which means there are more than 4,000 day users of the lake facilities on a heavy weekend day. Due to the limited public access there is an outside limit to the number of people who can be accommodated.

The lake offers a variety of both summer and winter recreational opportunities including swimming, boating, fishing (including ice fishing), water skiing, skin diving, snowmobiling, ice boat sailing, ice skating, picnicking, or enjoying the amusement park facilities. In the past, visitors enjoyed excursion boating on the lake or taking the Livonia, Avon, and Lakeville Railroad 23-mile scenic excursion trip, but these no longer exist, the excursion train having ceased operations two years ago. The south end of the lake is a wetland, which attracts waterfowl and serves as a spawning area for the lake fish. This area, has 1141 acres, is all owned now by the NYS Department of Environmental Conservation.

The public may use the boat landing at the north end of the lake, just off East Lake Road. It is operated by the State of New York with an annual attendance of approximately 34,000. There are also a number of private boat launch or boat rental services on the lake. The majority of people that do use the lake for boating own property adjacent to the lake and maintain their own private docking facilities. A recent Conesus Lake Association boating survey indicates that there are approximately 2,000 motor boats of lengths varying from 10 feet to 25 feet and from three-quarter HP to excess of 200 HP. There are also about 1,000 sailboats that regularly use the lake. (CLA letter - 27 October 1979). There is no charge for use of the State launching facility.

The amusement park at Long Point attracts hundreds of visitors (no figure available) from a 50-mile radius of Conesus Lake. The park has a refreshment stand, picnic pavilion, miniature golf, penny arcade, roller skating, amusement rides, and swimming. The facilities have not received any flood damage, other than beach erosion, from flooding.

Conesus Lake competes to some extent with Honeoye and Canandaigua Lakes for lake-oriented recreation. Conesus is more conveniently located to Rochester, while Canandaigua has a better range of public facilities. Hemlock Lake as a recreational site, is limited by the fact that it is owned by the City of Rochester and serves as a major source of water supply.

Other recreation areas, as noted above, do not compete for the same type of recreational preferences as Conesus Lake.

Educational Facilities

Children living on Conesus Lake attend school either in the Geneseo or Livonia School district. Geneseo Central School District encompasses the Village of Geneseo, nearly all of the Towns of Geneseo and Conesus serving an approximate population of 14,000. The District has one high school, Geneseo Central High School, with an enrollment of 600 students. The Livonia Central School District encompasses the Village of Livonia and nearly all of the Towns of Livonia and Groveland. This District serves an estimated population of 8,000 and maintains four schools, Livonia Elementary, Livonia Middle School, Hemlock School, and Livonia High School.

The State University College of New York at Geneseo also serves the area and many faculty and staff live at the lake. The college currently has an enrollment of 4,500 students with 275 faculty and 550 staff. The college provides many cultural activities for lake residents.

There are eight public libraries and four historical museums in the County. Many cultural exhibits, concerts, plays, etc., are also available to lake residents in Rochester.

EXISTING ACTIVITIES

This section describes the current land use activity in the floodplain.

Characteristics of Activities

As shown in Figures B3 and B4, land use in the immediate area of the floodplain is primarily residential. Land use in the Conesus drainage basin is shown in Table B22.

The activity most susceptible to flooding is the residential land use at the lake shore, especially those homes or cottages situated at the lower elevations or near the Conesus Outlet. There are approximately 1700 residences at the lake, including mobile homes. Many of these are located on the lake shore in the floodprone area. The estimated value of these dwellings ranges from $1000 to $100,000, based on stage-damage estimates. A survey of tax assessments done by the Conesus Lake Association in 1980 indicates the following assessed value of property in the floodplain by town:

Conesus		$12,053,200
Geneseo		13,600,100
Groveland		7,901,100
Livonia		32,324,200
	TOTAL	$65,858,600

This total includes homes and cottages (both year-round and seasonal), mobile homes, and businesses. The state has just gone to 100% assessment so this represents the current full assessed value of these properties.

The quality of housing stock at the lake varies considerably. Many of the dwellings are fairly old, having been built prior to World War II, and a few even older remain, especially in Livonia. Many of the units are built on very narrow lots, most are on 50 foot lots. Several structures occupy long, narrow lots that were, in fact, the platforms for the tent communities that once occupied many of the sites at such places as Long Point.

It is estimated that about 50% of the dwellings are winterized for year-round living. Also, about 15% of these winterized units are rented to faculty and students from the college at Geneseo. The presence of the perimeter sewer system together with other factors such as advantageous tax rates has encouraged improvements on lake dwellings for year-round living, and there is an increasing trend to upgrade many of the structures.

Table B22 - Land Use In Conesus Drainage Basin

Land Use	Percent of Drainage Basin[1]	Percent of Floodplain[2]
Residential & Commercial	2	25
Active Agriculture	50	--
Inactive Agriculture	10	--
Forest	30	--
Conesus Lake	8	75
TOTAL	100	100

[1]Source: Forest, et. al., Limnology of Conesus Lake, 1980.

[2]Source: Livingston County Planning Board, Land Use Maps for Towns of Conesus, Geneseo, Groveland, Livonia, 197?

The mobile homes generally occupy upland areas, except in the vicinity of the Conesus Creek Outlet. Under the proposed channelization plan it will be necessary to move a few of these mobile homes.

Many of the structures at the inlet on the south end of the lake are relatively new, lower priced cottages, but are occupied year-round. Several have been raised on courses of cinder blocks to mitigate flood damage.

The overall quality of structure varies both by location and by individual site.

The Eagle Point residents own their own marina, access road, and tennis courts. While this is one of the more affluent areas, it is highly flood prone. The residents here also own 500 feet on the upland side of the road in order to assure a buffer for their property.

There is some second and third tier home construction in selected areas on the upland slopes. Several new custom houses have been built near Densmore Shores. These are fairly expensive houses with a lovely view of the lake, but no direct access. Their are no known plans presently by developers to seek large parcels of land in the Conesus Lake area, although there have been some attempts in the past. One area of potential multifamily development is the Whispering Hills Mission, formerly a camp on the upland side of Route 256 above Sleggs Landing. The site is presently connected to the perimeter sewer and could support more dense development.

SUMMARY

The floodplain of Conesus Lake is densely developed primarily with single family homes and cottages, about 50% of which have year-round occupancy. Many of these dwellings are older, and are being upgraded in response to economic conditions. The lake has typically been a recreation area, but is becoming a year-round community. There is presently very little commercial activity in the floodplain. There is limited opportunity for new construction on the lake; however, flood management could increase the overall value of existing structures and encourage further upgrading.

PROJECTED ACTIVITIES IN AFFECTED AREA

Before the impact of any flood abatement project can be assessed, it is necessary to investigate available projections of population, employment, income, housing and land use for the area without regard to flood prevention. The projection of conditions without the project provide a baseline for comparison of anticipated impact.

POPULATION

Long range projections of any type are imprecise at best. However, trends do exist which, when extrapolated out fifty years, give suggestions of future conditions. All such projections must assume continuance of basic life patterns and philosophies. With current energy and natural resource shortages, high inflation and recession, and changing birth rates, the long-range validity of any projection is questionable.

The U. S. Department of Commerce (former Office of Business Economics or OBE) and the U. S. Department of Agriculture (Economic Research Service or ERS), recognizing the need for usable projected statistics, cooperated in developing the OBERS projections for regional economic activity. This study, under cooperative agreement with the Water Resources Council, divided the nation into various statistical entities and projected population, income and employment to the year 2020. Table B23 presents this data for the Rochester SMSA. The projections have been extended an additional ten years using a straight line method to reflect the 50 year planning period for any flood abatement program. The population trend utilized Series E in developing the projections which assumes a national birth rate that will eventually result in a no growth, or stable, population.

The State of New York has also made projections, but on a more disaggregate level. Census base-data was distributed to the county, town and city levels; however, these projections are not to be utilized as precise forecasts. Table B24 compares the OBERS and NYS population projections and also presents the State projections for the study area consisting of the four towns in Livingston County which comprise Conesus Lake. These also have been extended to 2030 using a straight line projection method.

According to this technique, the State and Federal projections differ by about 18% in 2000 and by 24% in 2030 for the Rochester SMSA, as shown in Figure B6. The 1980 Census figures indicate that the OBERS 1980 projections for the SMSA are high by about 8%. Overall population growth for Livingston County between 1980 and 2000 is forecast to be about 27%, and about 28% between

Table B23 - Rochester SMSA

Population, Employment, Personal Income, and Earnings by Industry, Historical and Projected, Selected Years, 1970-2030

	1970	1980	1990	2000	2010*	2020	2030*
Population, midyear	883,574	1,059,000	1,247,000	1,412,500	1,542,700	1,703,900	1,865,100
Per capita income (1967 $)	3,940	5,400	7,000	9,100	13,000	14,500	15,800
Per capita income relative (U.S.=1.00)	1.13	1.14	1.14	1.12	1.11	1.10	1.10
Total employment	359,547	486,700	577,300	672,000	713,300	788,900	864,400
Employment/population ratio	.41	.46	.46	.46	.46	.46	.46
			In Thousands of 1967 Dollars				
Total personal income	3,481,634	5,795,000	8,752,200	12,966,300	20,045,900	24,796,300	29,546,600
Total earnings	2,895,254	4,746,500	7,061,300	10,335,400	15,793,300	19,475,600	23,157,900
Agriculture, forestry and fisheries	51,350a	56,100	60,100	66,800	77,100	84,100	91,100
Mining	2,858b	10,700	15,700	21,300	28,800	34,900	40,900
Contract construction	144,022	271,600	400,600	578,700	859,400	1,055,400	1,251,300
Manufacturing	1,398,684	2,081,300	2,917,000	4,027,900	5,726,500	6,941,600	8,156,700
Trans., comm. and public utilities	117,054	201,300	309,400	463,400	728,000	903,500	1,079,000
Wholesale and retail trade	371,491	592,200	855,600	1,226,500	1,796,600	2,198,000	2,599,400
Finance, insurance and real estate	100,788	193,500	313,300	488,000	810,000	992,200	1,174,400
Services	355,613	736,700	1,242,100	2,010,900	3,463,700	4,372,700	5,281,700
Government	346,492	599,800	947,200	1,451,500	2,319,600	2,892,800	3,466,000

*Extrapolated based on change between 1980 and 2020.
a-Represents 80.0 to 99.9 percent of the true value.
b-Represents 20.0 to 39.9 percent of the true value.

Source: OBERS Projections, Regional Economic Activity in the U.S. Series E Population Vol. 5: Standard Metroploitan Statistical Areas. U.S. Water Resources Council, Washington, D.C., 1974.

Table B24 - Population Projections

	1970*	1980*	1990	2000	2010**	2020**	2030***
New York State (OBERS)	18,241,391	17,557,288	20,945,600	22,438,400	23,828,400	25,218,400	26,685,000
New York State (NYSEDB)	18,241,391	17,557,288	18,760,708	19,711,607	20,662,500	21,613,400	22,496,200
Rochester SMSA (OBERS)	961,516	971,879	1,247,000	1,412,500	1,542,700	1,703,900	1,865,100
Rochester SMSA (NYSEDB)	961,516	971,879	1,074,400	1,194,400	1,297,400	1,400,400	1,503,400
Livingston County (NYSEDB)	54,000	57,000	66,200	72,600	79,100	85,600	92,100
Conesus (T)	1,500	1,700	1,800	2,000	2,100	2,200	2,300
Geneseo (T)	7,300	8,700	9,300	9,800	10,300	10,800	11,300
Groveland (T)	3,000	2,100	3,200	3,500	3,800	4,100	4,400
Livonia (T)	5,300	5,700	6,700	7,500	8,200	8,900	9,600

* Census figures.
** NYS projections for 2010 and 2020 extrapolated based on change between 1980 and 2000.
*** All projections extrapolated based on change between 1980 and 2020.

Source: 1972 OBERS Projections, 1974
U. S. Bureau of Census, 1970
U. S. Bureau of Census, NYS Advance Report of *the 1980 Census of Population* and Housing, 1980.
NYS Economic Development Board, 1978
NYS Department of Commerce, 1978
NYS Department of Environmental Conservation, 1978

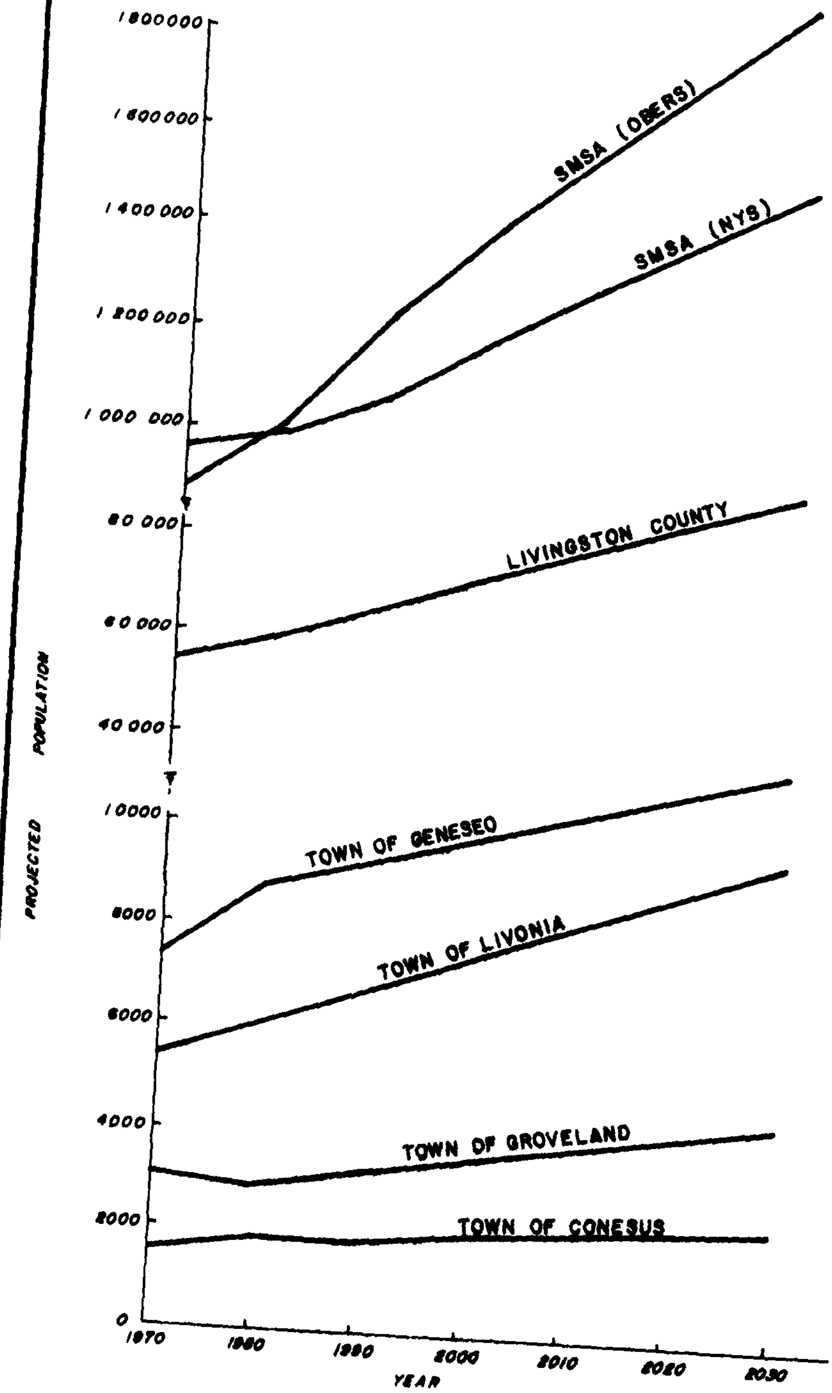
2000 and 2030. According to these data, the Towns of Livonia and Groveland will increase at the higher rates of 32% and 66% between 1980 and 2000, respectively, and about 27% between 2000 and 2030. Conesus and Geneseo are forecast to increase approximately 17% and 13% between 1980 and 2000, respectively, and 15% between 2000 and 2030. This growth will result in needs for more housing, services, and jobs.

HOUSING

The overall population growth in the region and the County will bring pressures for additional housing, and for replacement of older structures. In the vicinity of Conesus Lake, it is clear there will be additional pressures for housing and other development associated with the Genesee Expressway. The access at interchanges in proximity to Geneseo and Lakeville will make this an attractive rural home location for many who would have an easy commute to Rochester. Neither the County, the G/FLRPC, nor the NYSDOT has made any quantitative projections of the impact of the highway facility, however, the County has assumed high density development in the vicinity of the interchange at Route 20A and Routes 5/20, as shown in the year 2000 plan, Plate 1. The NYSDOT made some projections for population and traffic on the total facility, but did not perform subarea analyses of growth impacts. The Rochester Center for Governmental Research, Inc., in their Community Analysis Model (CAM) of 1978 made some projections of housing needs to 1985 but did not include special projections related to the Expressway. The following discussion is a generalized estimate of growth in the immediate area of Conesus Lake, but is not intended to serve as a planning forecast.

The flood control project cannot be expected to have a significant direct effect on the number of dwellings in the floodplain because of the limited buildable land. There will, of course, continue to be improvements and modifications to the housing stock, and there will probably also be some second and third tier building above the lakeshore development.

Table B25 presents a generalized approach to potential housing changes in the area, based on the factors discussed above, and a constant family size of 2.5 persons.



CONESUS LAKE, NEW YORK

COMPARISON OF PROJECTED POPULATION OBERS AND NYS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE B-5

BY ____ DATE ____
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Table B25 - Projected Housing Needs for Livingston County

	1970 [a]	1980 [a]	1990 [b]	2000	2010	2020	2030
Population	54,000	59,600	66,200	72,600	79,100	85,600	92,100
Average Household - Size	3.3	2.8	2.6	2.5	2.5	2.5	2.5
Total Units Needed	15,409	18,447	25,461	29,040	31,640	34,240	36,840
Total New Units Per Decade	--	3,038	7,014	3,579	2,600	2,600	2,600

(a) Source: Community Analysis Model (CAM), Center for Governmental Research, Inc., 1978.

(b) From Table B22.

With the constraints on developable land, especially in the Conesus Lake area, it will be necessary to fill the projected needs with multiple-unit dwellings. The average housing density in Livingston County in 1970 was 2.6 dwelling units per acre of residential land. While it is expected that the residential acreage could increase to about double the present use, residential densities would increase to 3.2 d.u. per acre by 2030.

REGIONAL INTERDEPENDENCE

The regional dependence of Livingston County on the Rochester metropolitan area has previously been shown. This relationship will continue, particularly if Livingston County remains primarily agricultural, as is currently planned. The lake management plan at Conesus Lake will not have any direct impact upon this, except to the extent that people with higher incomes, and thus a greater propensity to purchase goods and services, move into homes in the lake vicinity.

The Genesee Expressway will be a positive link between Livingston and Monroe Counties. More people will be able to commute more speedily and more efficiently from Livingston County to Monroe County, for employment, cultural, business, recreational, or shopping purposes. Opportunities for interaction with the activities available in Rochester will be more readily accessible to Lake residents as well as to other residents in Geneseo, Livonia and Groveland. There will be similar opportunities for Monroe County residents to reach recreation centers at Conesus Lake, Letchworth State Park, Stony Brook State Park, and other hunting, fishing, skiing and natural areas in Livingston County. These opportunities existed prior to the expressway, but were not readily accessible.

Also, the expressway can afford a more efficient means of transport of agricultural and manufactured goods produced in Livingston County to the major distribution centers in Rochester; and consumer goods from Rochester can more easily move to outlets in Livingston County.

INCOME

Total personal income (in 1967 dollars) is projected by the OBERS analysis to grow at an increasing rate by 2020 (line 3, Table B23): Per capita income will also grow and, in the Rochester SMSA will continue to exceed the national average by 12-14%. However, due to a combination of factors related to the rate of increase in total personal income and population growth, by 2020 the per capita income ratio in the Rochester SMSA will drop to only 10% in excess of the national average. This is indicative of the overall assumption in the OBERS projections of a leveling out of the disparities in income nationwide in the long term.

WHOLESALE AND RETAIL TRADE

There are no current, publicly available statistics of projections of wholesale and retail trade figures. These sectors of the economy are vitally important to the economy of the Rochester area and are revised annually to reflect changes in product mix, inflation, consumer preferences, etc. A very rough estimation can be made using Census figures and factoring to the year 2030. The results are shown in Table B26.

MANUFACTURING, EMPLOYMENT, AND OUTPUT

Estimates of total employment and earnings by industry sector were presented in Table B23. According to these projections there will be an increase in employment figures of nearly 1.5 times the 1970 level, with a higher labor participation rate. The recession and consequent layoffs, as well as the closing of several units in the Rochester area, will undoubtedly affect the 1980 figures as well as future projections.

As with the population figures, this is a difficult period in which to make estimates of economic activity for the future. The Rochester Center for Governmental Research, Inc. is in the process of revising projections, based on the 1980 Census, but they were not available for this report.

Current practice among industry is to make major decisions of relocation to areas of lower paid labor forces, usually the south or west. These decisions are made when present facilities are in need of modernization or expansion. This trend has led to a decline in manufacturing in central New York, but also in other regions of the northeast. State, regional and local governments are aware of this drain on the economy and are attempting to discourage and even reverse the flow of firms from the region by offering tax incentives and other assistance. These efforts have been successful in attracting some new firms to the area, and in keeping other industries from moving. The types of manufacturing industry in the Rochester area, mostly "high-tech" facilities related to photographic, optical, and business machines, portends a more stable picture of growth.

There has been some reversal of the downward trend in manufacturing and employment, as the Rochester Area Chamber of Commerce reported the development of 3200 jobs in 1979.

SUMMARY

The Rochester area appears to be growing at a slower pace than current long term projections indicate. The rate of decline will be relatively less than for other parts of the State. There will be growth development pressures on Livingston County, related in part to the Genesee Expressway.

Table B26 - Wholesale and Retail Sales Projections
Rochester SMSA
(000's 1967 Dollars)

	Wholesale Trade	Retail Trade
1967	$1711	$1495
1972	1890	1782
1977	2133	1963
1980	2290	2080
1990	2790	2480
2000	3290	2880
2010	3790	3280
2020	4290	3680
2030	4790	4080

Source: U.S. Census of Business, 1977 and
Rochester Center for Government Research,
CAM Data, 1978.

POTENTIAL LAND USE IN AFFECTED AREA

The future land use in the Conesus Lake area is likely to remain much the same as at present, i.e. lake residential. Based on current zoning, the kinds of changes which are probable, especially if the flood management is implemented, include:

- o Higher density development in some areas of the lakeshore, particularly those zoned for such densities, e.g. along the north shore of the lake in the Town of Livonia.

- o A combination of multi-family structures and "executive" type single family homes in the upland areas.

- o Commercial development in the villages of Geneseo and Livonia and in Lakeville. (Much of this will be associated with the Genesee Expressway.)

- o Upgrading and/or winterizing of present dwellings.

Currently zoning limits multiunit housing to eight units, for most lake property. This is a likely limit over the long term due to the constraints on available land. The limits on upland development will be governed by zoning, water supply, and the potential for affecting the ability of the land to absorb storm water, thus causing possible flooding in the gullies that drain into Conesus Lake and increasing the lake level. There will undoubtedly be strong pressures for higher intensity development at the lake.

Conesus Lake probably has the highest year round occupancy of any of the Finger Lakes. This is likely to increase to perhaps 80% to 85% by the year 2000 with the advent of both the Genesee Expressway and the flood management plan at the lake. During the 50 year planning period the full-time occupancy would be higher but the recreational character of the lake would be maintained.

New construction and major remodeling on the lake shore will also be governed by the requirements of the flood insurance program.

Given present policy and attitudes of both the County and lake residents, it is unlikely that there will be commercial or industrial development on the lake shore or upland area, with the exception of the hamlet of Lakeville. Its location at the intersection of two state highways (Routes 20A and 15) both of which are on interchanges for the Genesee Expressway, make it an obvious location for development. In fact, there is currently a proposal before the planning board to rezone about 120 acres in the southwest quadrant of the intersection of

Routes 15 and 256 from agricultural to commercial. No site plan has been presented and the intended use is not known.

Local newspapers have been publishing stories indicating a move toward speculative land purchases in the northern part of the County adjacent to the I-390 corridor. It is not the function of this study to predict the level of development as a result of the expressway. However, a rought estimate of the level of development can be made using the Livingston County year 2000 land use plan - the "DAN" Plan as a base. This is the plan which is intended to guide development, and which reflects land use goals and policies of the County. Plate 1 illustrates this plan. The plan provides for "directing development (D) into areas best suited for intensified land uses, and maintaining very low development densities in the County's prime agricultural areas (A) and natural resource areas (N)".

Under this plan about 30% of the land would be designated for development. High density development would be centered in and around the villages, and would include areas where public water and sewer systems are likely to be provided. High density could be as high as 15 dwelling units (d.u.) per acre, and is estimated to average about 4 to 6 d.u.s. in the vicinity of the expressway. This classification would also include commercial, industrial, and non-residential uses. About 10% of the total land area would be in high density development.

Medium to low density areas, about 20% of the total, would be limited to residential development of one-half acre to three-acre lots depending on the permeability of the soil.

Agricultural areas, comprising about 37% of the total County land, would restrict development to minimum building lot size of 10 acres. The remaining designation, natural areas, is constrained to the same density as agriculture, and represents 33% of the total.

The plan calls for encouraging zoning controls in the vicinity of the expressway interchanges to prevent strip development, and protecting the scenic quality along the expressway.

These figures represent goals for the County but cannot be quantified in terms of demand without further refinement. In 1970, according to the Rochester Center for Governmental Research, the average population per residential acre in Livingston County was 8.3 persons. The center has made projections for 1985 (using 1970 Census data) resulting in an estimated 6.3 persons per residential acre, reflecting a 35% increase in residential average between 1970 and 1985. These figures also project a slight decline in 1985 county population,

whereas the State projected a 22.5% increase in population by 1990. The Center is currently preparing revised projections based on the 1985 Census and the county is in the process of revising the comprehensive plan, resulting in uncertainty about long term changes in land use.

Previous experience with new highways indicates that in rural communities on the fringe of urban areas the initial population increase is generally the most significant. What was an agricultural community will tend to become residential with a growth of ancillary services and industries in proximity to the interchanges. Occupations of new residents will differ from present residents, and they will in general have higher income levels. There also tends to be a broadening of the labor base, including an increase in the number of working wives (Vlachos, 1976).

Based on a seven-year study of several communities in Pennsylvania, the following effects were observed, as shown in Table B27.

Similar effects have been observed in other highway impact studies. From this it can be concluded that there will be significant changes resulting from the expressway in Livingston County. The degree of change will depend on the type and level of planning and zoning control enforced by the County.

Table B27 - Effects of Highways on Communities

	PERCENT INCREASE	
	Communities Without Highways	Communities With Highways
Population Change	3	39
Value of Real Property	52	116
School Population	12	42
Government Expenditures	22	242
School Expenditures	86	215
Taxes Levied for All Purposes	40	122

Source: Vlachos, 1976, as quoted from Frey et. al.

SUMMARY

Based on current trends and data, it appears that land use changes will not be significantly affected by the flood

management at Conesus Lake; the land use at the lake and adjoining uplands will remain lake residential but will intensify in the density of development and will become primarily year-round residential. New construction will be constrained by the flood insurance permitting requirements, zoning, water supply, and runoff effects.

The adjacent areas in Livingston County are bound to grow in conjunction with the secondary effects of the Genesee Expressway. Population density will increase, which could affect the Conesus drainage basin, especially since farmland and forest may be converted to urbanized areas. The rate of development growth will be constrained by the energy situation, zoning, and overall economic conditions in the Rochester area.

PROJECTED LAND USE BENEFITS IN STUDY AREA AND ADJACENT AREAS

WITHOUT FLOOD MANAGEMENT PLAN

If the flood management plan for Conesus Lake is not implemented the flood problems will continue to occur as in the past. The degree of impact will vary with the lake level.

While it is assumed that most current homeowners on Conesus Lake have taken advantage of the Flood Insurance program available from the Flood Insurance Administration (FIA), such coverage is only applicable to the dwelling structure and contents and does not cover outbuildings, docks, landscaping, beaches, or other improvements. It will be necessary for new owners or for owners of existing dwellings which are remodeled to obtain this insurance, probably at higher rates over time.

In an inflationary period, clean-up costs as well as replacement and repair expenses resulting from a flooding situation could be important factors. If such costs become prohibitive to an owner, repairs might be delayed. If several owners are unable to make repairs in a timely fashion, the appearance and quality of dwellings and businesses on the lake could quickly deteriorate.

Should the lake level management plan not be implemented, there would be less incentive for upgrading and improving property, which is a generally desirable goal for the future lake development. Should properties not be maintained, overall property values would decline.

The continued concern over potential flooding every spring, or during exceptionally heavy storms, is an added burden for lake residents which could be relieved with a flood management plan; also the cost of flood watches, patrols, evacuating, and flood proofing would be necessary for all conditions without the flood management plan.

A no-action alternative would have relatively little effect outside the floodplain except to the extent that County-wide property values, and hence taxes, would be somewhat lower.

Currently the lake level drops frequently in the late summer causing inconvenience to boaters and fishermen. In some instances supplemental docking facilities must be constructed to permit boaters to continue to enjoy the lake.

In summary, continuation of the fluctuating lake levels is costly and unproductive.

WITH 30-60 FLOOD MANAGEMENT PLAN

This plan would include both structural and nonstructural features. The structural aspects would include construction of a new 25-foot wide trapezoidal channel to the lake which would start about 400 feet downstream of the private road bridge at the mouth of the outlet. The channel would be about 260 feet long and would be constructed through an existing trailer park. A control structure consisting of steel sheet-piling would be constructed about 100 feet upstream of the Route 20A bridge. Riprap would probably extend from about 50 feet upstream of the control structure to the Route 20A bridge. A 35-foot wide trapezoidal channel would be constructed from the Route 20A bridge to a point about 4,000 feet upstream of the Route 256 bridge (just below the sewage treatment plant). A schematic diagram of the plan is shown in the main report on Plate 1.

The nonstructural aspect of the action consists of a lake level management scheme which will reduce flood damages while considering required lake levels for recreation, fish and wildlife, water supply and downstream water demand. The target levels shown on Table B28 were established in coordination with the New York State Department of Environmental Conservation, the U. S. Fish and Wildlife Service and the Conesus Lake Association. It is anticipated that the natural fluctuation of the lake level would be used to store excess spring runoff which then could be released gradually to reduce flood damages. Conversely, during years of low precipitation, the lake level could usually be maintained at the desired lake level. A more detailed description and status of the lake level Regulation Plan can be found in Appendix A, Hydraulics and Hydrology.

The effect of this two-pronged approach would be to control the flooding to the 25-year flood level, which should alleviate the type of recurring flood problems encountered over the years. This will reduce the uncertainty related to making decisions on rebuilding, restoring, and upgrading of existing structures. This will also encourage better construction on the few remaining sites on the lake shore. In addition, it is possible thatafter the plan is implemented the flood insurnce maps could be redrawn and insurance rates reduced. The plan will not, however, result in significant control of higher flood levels.

Table B28 - Desired Lake Levels for Conesus Lake
(Refer to Appendix A for more detail)

Criteria	Range		Period	Remarks
	Upper	Lower		
Flooding	819.5	N.A.	At all times	Minor Damage Begins
Recreation	819	818	Apr. 15 - Oct. 15	Wet Perimeter (819) Mosquitoes (819) Recreational Difficulty (Lakeville) (818)
Environmental	819.5	819	Mar. 1 thru June 15	Fish Spawning (Northern)
Intakes (Municipal)	N.A.	815(-)	At all times	Intakes are very deep No anticipated problem
Outflows	-	816.5	At all times	Inadequate outflow capacity below this level
Winter Levels	-	816.5	Nov.Dec.Jan.Feb.	Provides storage for flood control

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Implementation of the 30-60 Plan will have the effect of reversing many of the effects noted in the no-action alternative resulting in high tax revenues (based on high values), improvement in quality of housing stock, greater safety, reduced costs of patrols and flood proofing, and savings in costs of clean-up, and insurance claims for replacement and repair.

The major negative effects will result from the necessity of relocating about six mobile homes. Because these dwellings can be moved relatively easily, to a similar location, there may be some feelings of disruption experienced by the occupants of these units. Through careful planning and communications these negative effects can be mitigated and the persons displaced can also benefit from the reduced flood potential.

The Conesus community will also be required to bear the costs of moving or replacing infrastructure; this is expected to be about 25% of the project cost.

The effects that may be anticipated in the affected area include a possibly greater demand for year-round homes at the lake and for use of the recreational facilities. The joint effect of improved conditions at the lake and the improved accessibility created by the Genesee Expressway could result in greater pressures for second and third tier development in the upland areas, especially in Geneseo and Livonia.

A short term effect will be the generation of more construction jobs in the area. Commercial development will be related to growth generated from the expressway, but there will be ripple effects from changes at the lake, especially if there is an increase in average income of the lake population.

The general effect of this alternative will be positive, for the floodplain area and the entire Finger Lakes region.

EXISTING FLOOD DAMAGES

LOSSES SUSTAINED DURING HISTORICAL FLOODS

Historical flooding is discussed in detail in Appendix A. This section presents an overview of historical flooding as it pertains to the determination of inundation reduction benefits.

Significant flood damage to properties around the perimeter of Conesus Lake is reported to have occurred during 8 out of 47 years for the period from 1930 to 1977. Unfortunately there is little, if any, documentation of the damage costs for most of these floods, so a quantification of average annual damages from the historical record is not feasible.

The highest recorded lake level is 822.50 feet, which resulted from Tropical Storm Agnes in 1972. Approximately 450 residences were affected by this flood.

DAMAGE SURVEY

In the absence of an adequate historical flood damage data base, average annual damages were evaluated by means of a detailed damage survey. The survey was performed by the Buffalo District, U.S. Army Corps of Engineers during March and April of 1979. The results of this damage survey were used as the basis for determining average annual flood damages from estimated future flood occurrences and for estimating the benefits that would result from the considered plans of improvement. The methodology used to derive flood damages follows.

Residential Damages

The value, type of structure, and first floor elevation of each affected residential unit was established from field inspection. The value of household contents was determined based on structural value and actuarial data gathered by the Federal Emergency Management Agency in conjunction with the National Flood Insurance Program. The estimates of structural and content value considered the location of each unit relative to the neighborhood in terms of proximity to commercial development, schools and churches, general appearance of the structure, and the nature and extent of landscaping and other improvements. Damages to boating and dock facilities, landscaping and other damages were also considered. Damages were estimated at various flood depths based on depth-percent damage relationships. The initial damage elevation was defined as the flood height at which water entered the unit's lowest opening. Damages to the units were based on cost of repair, depreciated value or cost to replace. Approximately 510 units would be affected by the 1.0 percent chance flood. The market value of these properties total approximately 8.3 million dollars (March 1979 price levels).

Commercial Damages

All commercial damage estimates were based on personal interviews and include estimated damages to equipment, structures and inventory, lost wages, and anticipated cleanup costs. During the interviews with owners and/or managers of commercial units, field personnel documented the overall condition of the building and equipment as well as the type and value of inventory. There are 11 commercial establishments susceptible to flooding.

Public and Other Damages

The estimated damages to public facilities such as buildings, roads, bridges, and utilities were determined from calculated flood depths and field observations. Detour costs were based on traffic counts, variable costs of automobile and truck operators, and a cost of drive time for commercial truck operators. Emergency operations and cleanup costs incurred by local, state, and federal agencies were estimated based upon physical characteristics of the flooding (e.g., flood depths and durations), the flood emergency activities of the affected area, and field observations.

STAGE DAMAGE CURVE

The project has one reach. Therefore, only one index point, located at the north end of Conesus Lake, was selected. A stage-damage curve at the index point was developed. This curve represents damage to commercial units, structures and contents for residential units, public property, and other. It is shown on Figure B-7. Zero damage elevation at the Index Point is 819.4.

AVERAGE ANNUAL DAMAGES

Without Project Conditions

The average annual damages (at March 1979 price levels) for the present (without project) conditions were determined using the stage-damage curve, Figure B-7 and the Basis of Comparison stage-frequency curve presented in Appendix A. The results of this analysis were updated to March 1981 price levels and are displayed on Table B29.

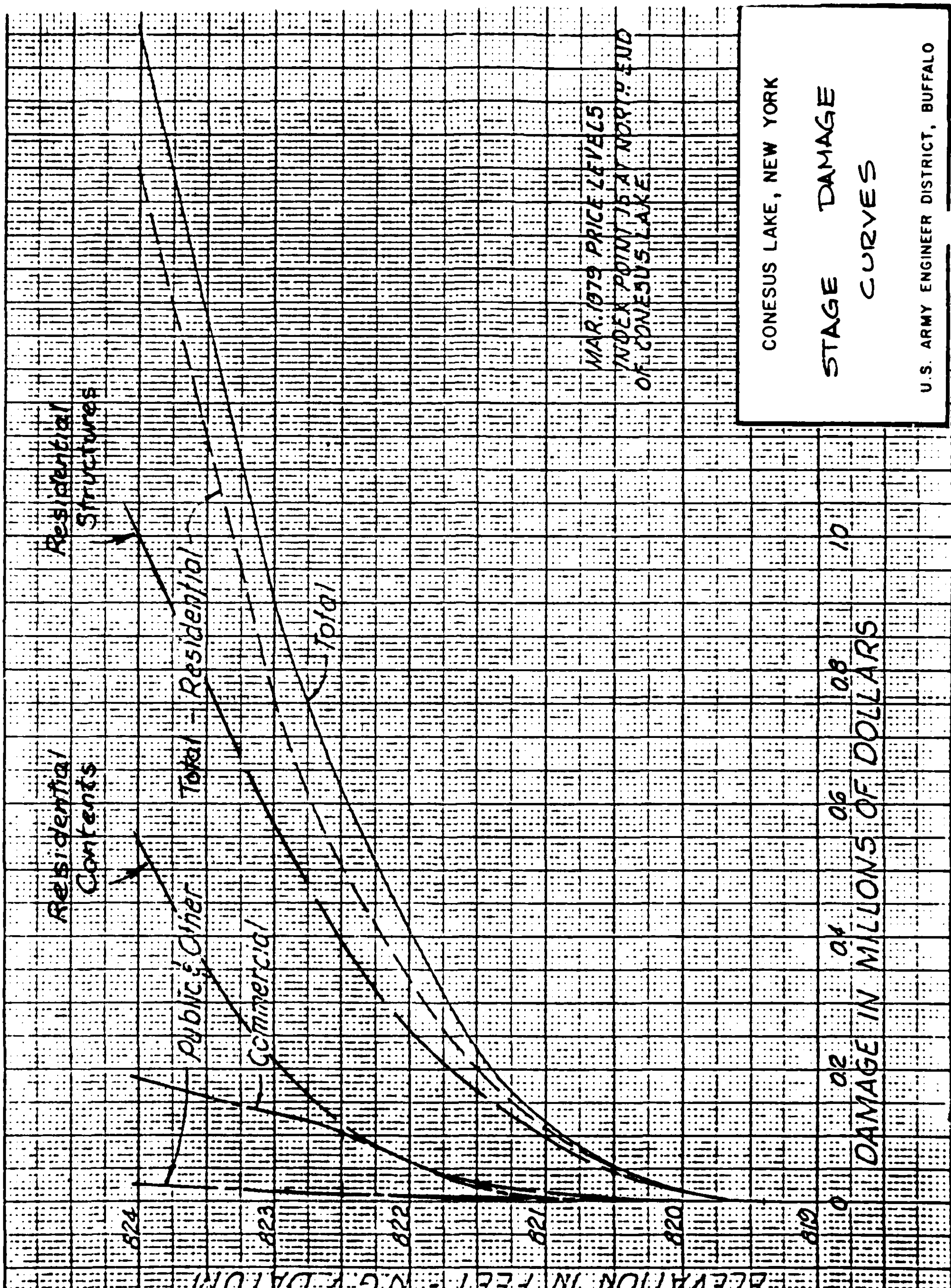
CONESUS LAKE, NEW YORK
STAGE DAMAGE CURVES
U.S. ARMY ENGINEER DISTRICT, BUFFALO
MAR. 1979 PRICE LEVELS
INDEX POINT IS AT NORTH END OF CONESUS LAKE
Residential Contents
Public & Other
Commercial
Total - Residential
Residential Structures
Total
ELEVATION IN FEET - N.G.V. DATUM
824
823
822
821
820
819
DAMAGE IN MILLIONS OF DOLLARS
0
0.2
0.4
0.6
0.8
1.0

FIGURE B7

Table B29 - Average Annual Flood Damages and Flood Reduction Benefits for Existing Conditions

Flood Damage Type	Average Annual Damages: Basis of Comparison	Average Annual Damages: 30/60 Plan	Inundation Reduction Benefits
	$	$	$
Residential			
Structures	80,200	3,400	76,800
Contents	17,600	700	16,900
Commercial	12,800	200	12,600
P&O	2,800	100	2,700
Total	113,400	4,400	109,000

(1) Based on March 1981 price levels.

With Project Conditions

The residual damages with the implementation of the 30/60 plan were determined using a similar procedure. However, the 30/60 plan stage frequency curve from Appendix A was used. The 30/60 plan curve reflects the improved discharge characteristics of the outlet channel. The average annual damages (residual) for the 30/60 plan at March 1981 price levels are displayed on Table B29, along with the inundation reduction benefits. The inundation reduction benefits are equal to the difference between the average annual damages without the proejct and the residual damages with the project.

PROJECTED FUTURE FLOOD DAMAGES

GENERAL

The projection of future flood damages and other costs of using the flood plain were evaluated in an abbreviated manner, because the project is considered to be economically feasible on the basis of inundation reduction damages for existing conditions. This determination was made using the benefit/cost ratio method. The average annual benefits, as determined in the previous section, were $109,000. On the basis of cost estimates presented in Appendix E, the first cost of the project was found to be $815,000 (March 1981 price levels). Using the current Federal discount rate of 7 3/8 percent and a 50 year project life, the annual depreciation and amortization for the project would be $61,900. Assuming that an annual maintenance would be approximately 2.0 percent of contractor's earnings minus lands ($12,000), the total annual cost of the project would be $73,900. The net NED benefits and benefit/cost ratio are:

Net NED Benefits	$109,000 - 73,900 = $35,100
Benefit/Cost Ratio	$109,000 / 73,900 = 1.47

Since this analysis indicated that the project is economically justifiable under existing conditions, the objective of further studies was to:

a. Anticipate changes in various factors which make up the project benefits and

b. Evaluate the sensitivity of the project's economic efficiency to these anticipated changes.

ECONOMIC CHANGES

The analysis of Projected Activities on the affected area (page B-51) indicated that the most significant economic changes will be increased development pressure from the opening of Interstate 390 and a growth in per capita income.

Interstate 390 will provide an expressway route between the Conesus Lake area and downtown Rochester. The reduction in travel time will make a Conesus Lake area residence more attractive for some people who are employed in Rochester or its suburbs. An individual considering such a change in living patterns would, of course, base a decision to move on the balance between the attractive setting of the Conesus Lake area and the higher fuel costs and longer commuting time which would result from moving further from his or her place of employment.

As was previously mentioned, the New York State Department of Transportation has not made any estimates of increased residential development which would result from freeway operation. A literature search was made to locate empirical data regarding increased residential development as a result of freeway operation in other areas. This search did not yield any quantitative data that could be applied to the I-390/Conesus Lake case. Furthermore, even if such data were available, its credibility would be questionable because of recent major fuel cost increases.

Although the literature search did not provide quantitative data, observations along I-490, which opened in the southeastern sector of the Rochester SMSA in the early 1970's does indicate that increased residential development frequently occurs around interchanges after freeways go into operation. In no case, was information encountered which would suggest a decrease in rural development as a result of freeways. Therefore it is considered reasonable to conclude that the opening of I-390 will either result in increased development in the Conesus Lake area or will not have any effect on development.

If increased development occurs, it appears reasonable to assume that some of it will take place along the lakefront, within the present flood plain. This assumption is based on the desirability of living on the lakefront for combined recreational/residential land use. Under present conditions, however, such development would be limited by restrictions on construction in the flood plain. These restrictions would preclude the construction of new homes. However, they would not prevent people from purchasing older houses and cottages in the flood plain and making extensive renovations to them. Although this renovation process has been going on for some time, the opening of the expressway is likely to accelerate it.

PROJECTION OF PHYSICAL DAMAGES

Physical Units

An analysis of the damage survey data reveals that approximately 510 residences would be affected by the 1.0 percent chance flood. These residences are distributed around the perimeter of Conesus Lake.

The size, type and quality of the affected residences varies. A number of the residences are trailers. Of the permanent dwelling units many are old and quite small. However, there are some areas where large relatively new houses have been built on the flood plain. It is estimated that approximately 50 percent of the lakeshore dwelling units are lived in on a year round basis. The balance are summer cottages. However, there is an increasing trend to winterize these cottages and upgrade them for year-round living. The perimeter sewer system and low tax rates makes these conversions attractive.

There is relatively little available open land in the flood plain. Therefore it is expected that most changes in the flood plain housing stock will come from demolition/rebuilding or renovation of existing structures. Restrictions on building in the 1.0 percent chance flood plain would limit the amount of new construction or demolition/rebuilding activity. Therefore it is expected that, without the proposed project, most changes in the flood plain housing stock will result from upgrading existing structures.

The present trend for upgrading houses in the flood plain is expected to intensify as a result of the opening of Interstate 390. This intensification is expected to be most significant in the northern part of the Towns of Geneseo and Livonia since these areas are closest to the I-390 interchange. Development intensification is expected in these areas, because I-390 places them within a reasonable commuting time of the employment centers of metropolitan Rochester.

Without the implementation of the proposed project, the intensification activities in the flood plain are expected to include:

- Winterization including insulating and the installation of heating units.
- Replacement of interior walls, ceilings, and floors.
- Landscaping.
- Installations of new plumbing and electrical systems and fixtures.
- Installation of new appliances.

Many of these improvements are susceptible to damage from flooding and would therefore intensify the damage which would occur from a given flood stage. These increases in damage are discussed in the following sections.

Value of Physical Units

The present values of residential units in the flood plain were determined from the damage survey. However, because of projected economic growth and development intensification, these values are not expected to remain constant for the fifty year life of the proposed project.

Changes in the value of residential units were examined in two ways, each of which reflects a future scenario. The first scenario assumes that the opening of I-390 will not cause people to move into the flood plain and that growth will be

based on changes in the economic status of present residents. The second scenario assumes that I-390 will induce some people presently living elsewhere to move into the flood plain. The second scenario also assumes that the economic status of the new residents will be somewhat higher than the present residents. The objective of analyzing two scenarios was to evaluate the sensitivity of the project's economic efficiency to a range of growth patterns. This is considered important because of a lack of empirical data on which to base growth projections and uncertain future transportation costs. There is considerable qualitative evidence to support the hypothesis that the opening of an expressway fosters growth around its interchanges and promotes movement of urban area workers to outlying areas. However, most of these cases occurred when motor fuel costs were approximately one third of their present levels. Therefore, prior history may not be repeated in the Conesus Lake area.

The first scenario is based on the premise that the complexion of the flood plain population will not change significantly and that growth in the flood plain will be limited to growth in the contents of residential units. This growth would be fostered by future affluence which is a function of growth in per capita income (adjusted for inflation). The OBERS projections indicate that per capita income in the Rochester SMSA is expected to grow at a rate of 2.5 percent per year (compounded annually) between 1980 and 2020. Considering that I-390 will increase the cohesion between Livingston County and the rest of the Rochester SMSA, it appears reasonable to assume that this growth rate would be applicable to the study area.

The growth in residential content values was evaluated from the damage survey data and the OBERS projections for growth in per capita income. The value of contents for residences in the flood plain was determined as a percentage of the value of the structure using empirical relationships determined by the Federal Emergency Management Agency's flood insurance program. For the residences in the Conesus Lake flood plain, which are affected by the 1.0 percent chance flood, the present value of structures and estimated value of the contents are:

Structures	$8,324,000
Contents	$2,702,000

In accordance with the Water Resources Council's Principals and Standards, it was assumed that the value of the contents would not exceed 75 percent of the value of the structure. So the maximum future contents value was determined to be $6,243,000. Using the OBERS projection for a 2.5 percent annual increase in Per Capita Income, it was found that it would take 34 years for present residential contents to reach the maximum value.

The second scenario is based on the premise that I-390 will induce new residents to move into the flood plain and that these new residents will have the financial resources to make major improvements to the flood plain housing stock.

To evaluate the effects of this development, the distribution of unit residential values in the flood plain, Livingston County and the Rochester SMSA (Figure B-9) were examined. This figure was generated from the data gathered for the damage survey (adjusted back to 1970 price levels) and the data on Table B5. This figure indicates that the median home value in the flood plain is well below the median value for homes in Livingston County which is below the median value of homes in the Rochester SMSA. From these observations, it was concluded that the value of all houses in Livingston County are depressed by the distance from urban Rochester and that houses in the flood plain are also depressed by the flood hazard. It was assumed that the reduction in travel time offered by I-390 would create an increase in the amount of money people would invest in the renovation of a particular house. Examining the distribution by value group indicates that the flood plain contains a disproportionately high number of homes in the less than $15,000 group and a disproportionately low number of homes in the $15,000 to $35,000 group and an insignificant number of homes valued at more than $35,000 (all at 1970 price levels. Therefore, for the purpose of this analysis, it was assumed that the primary target for this investment would be the homes valued at less than $15,000 at 1970 price levels group which would be upgraded to values ranging from $15,000 to $50,000. Note: 1970 value levels were computed by multiplying 1979 values by a factor of 0.53. This ratio was derived from the Engineering News Record Construction Cost and Building Cost Indices for New York.

To evaluate the effect of renovation activities on the target group homes, a projected future stage damage curve was synthesized. The procedure for doing this involved several steps as follow.

1. The distribution of residential values by township was evaluated to determine the prime targets for renovation. This distribution is displayed on Figure B10. This distribution indicates that the median value in the Town of Geneseo is lower and number of homes in the less than $15,000 group is higher than the other three townships which have lake shoreline property.

2. The proximity of the shoreline residences to the I-390 interchange was considered to determine which areas would be most likely to be subject to renovation. The Towns of Geneseo and Livonia contain the shoreline property closest to an interchange.

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SUBJECT ______________________
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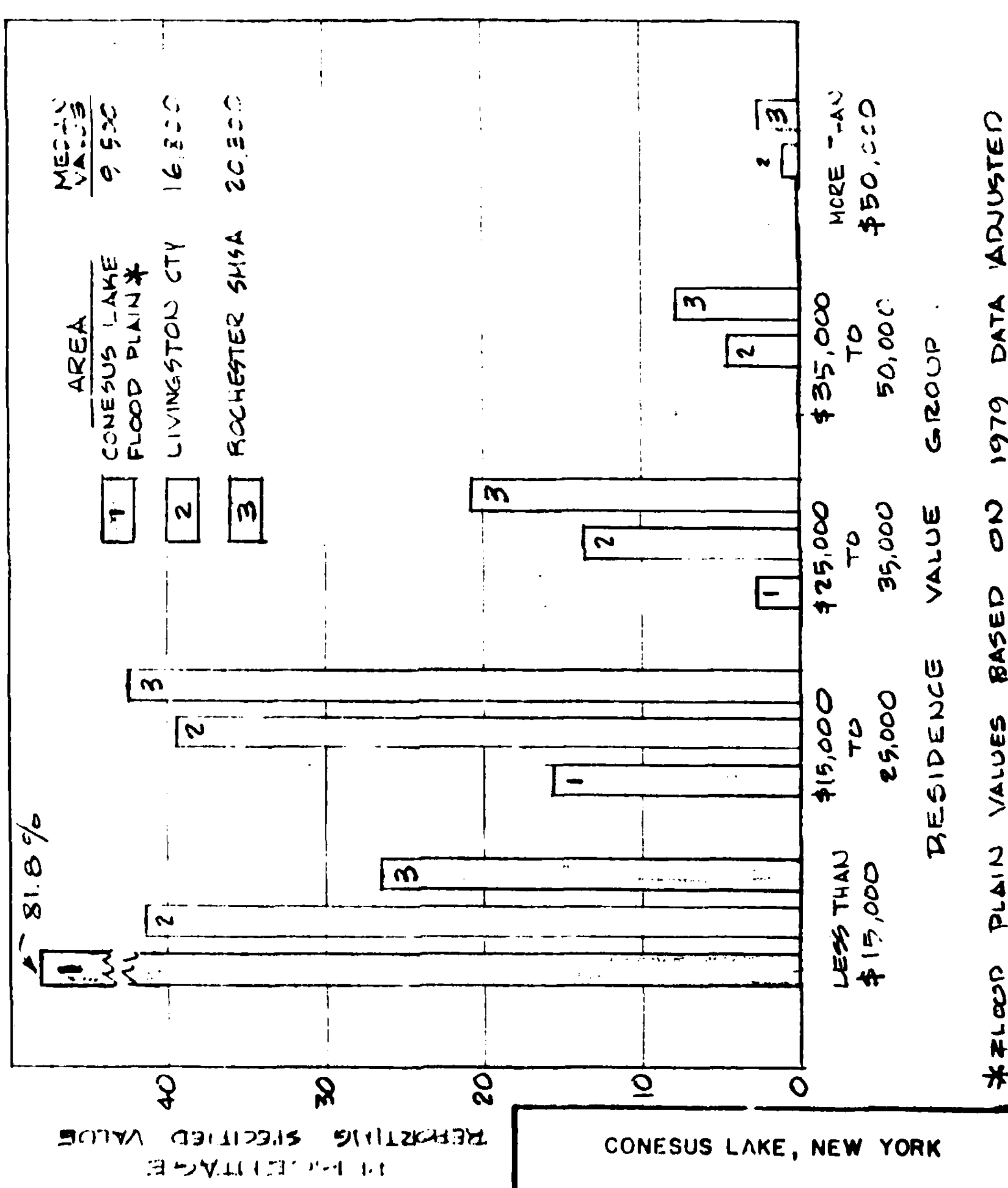

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CONESUS LAKE, NEW YORK

DISTRIBUTION OF RESIDENCE VALUES BY AREA

U.S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE B 8

3. The information from 1 and 2 was considered to indicate that the Town of Geneseo, and to a lesser extent the Town of Livonia, would be the prime target areas for intensive redevelopment. This is based on proximity to the I-390 interchange and the number of homes in the target group for renovation.

4. The value data for the damage survey was adjusted as follows:

   a. Homes in the Town of Geneseo valued at more than $5,000 but less than $25,000 were increased in value by 125 percent to account for renovation. $5,000 was considered a lower threshold level on the assumption that properties in extremely poor condition would not be renovated.

   b. Homes in the Town of Livonia valued at more than $15,000 but less than $35,000 were increased in value by 50 percent. This accounts for lesser renovations than in Livonia. A lower percentage was used for Livonia because it is more distant from the I-390 interchange.

As a result of these adjustments, the value of residential structures (both renovated and not renovated) in the IRF floodplain is expected to increase to $10,846,000 by the year 1995. The 1995 value of the contents in these structures is estimated to be $4,155,300. This includes affluence growth of the contents of structures not renovated. It is assumed that the value of contents in the renovated structures will increase after redevelopment is completed. This increase will result from future affluence. In accordance with the Water Resources Council's Principals and Standards, the growth in the value of these contents was estimated on the basis of the OBERS projection for Per Capita Income Growth (2.5% per anum). The estimated 1995 value of renovated structures and their contents are $6,301,000 and $1,987,500, respectively. Since the value of a structure's contents cannot exceed seventy five percent of the value of the structure, the maximum value of the contents of the renovated residences will be $4,725,700. It is estimated that this value will be reached in the year 2030.

The value of structures which are not expected to be renovated is $4,545,000. The value (March 1979) of the contents of these structures is $1,460,300. Based on a 2.5% per annum growth rate, the value of the contents of the non-renovated structures is expected to increase to $3,408,700 by the year 2013.

The above estimates for renovated and non-renovated residences were combined to provide estimates of the value of structures

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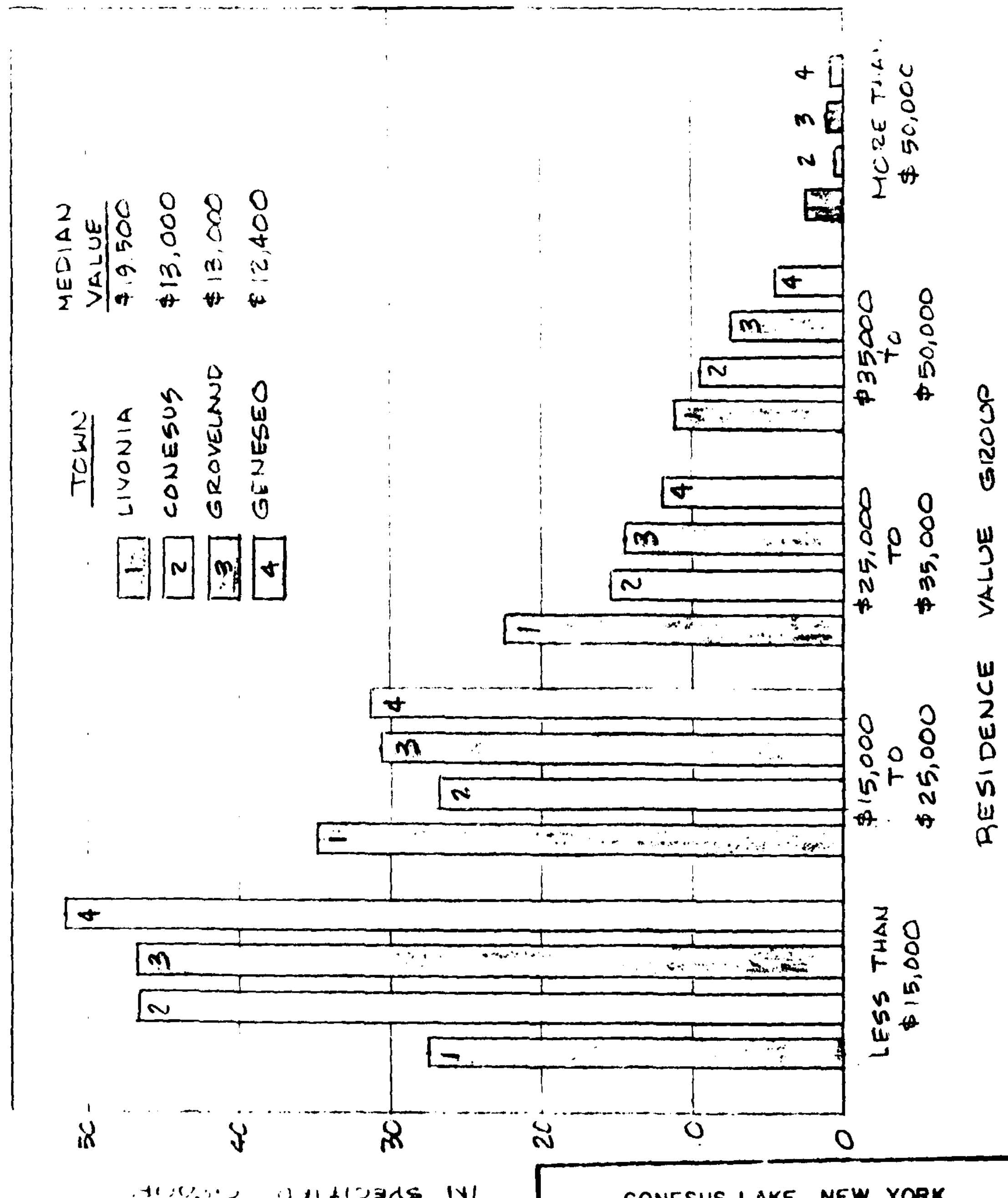

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CONESUS LAKE, NEW YORK
DISTRIBUTION OF FLOOD PLAIN RESIDENCE VALUES BY TOWN
U.S. ARMY ENGINEER DISTRICT, BUFFALO

FIGURE B 9

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AD-A115 570 CORPS OF ENGINEERS BUFFALO NY BUFFALO DISTRICT F/G 13/2
STAGE III DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STAT--ETC(U)
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and contents for the year 1979, 1995, 2013, and 2030 and beyond. These are presented on Table B30.

Table B30 - Values of Structures and Contents
Growth Scenario 2

Year	Value of Structures	Value of Contents
1979	8,324,000	2,702,100
1995	10,846,000	4,155,300
2013	10,846,000	6,509,200
2030 (and beyond)	10,846,000	7,134,400

Translation to Future Flood Damages

To translate the projections described in the previous section into future flood damages, the value of structures and contents for the future scenarios were used to develop estimates of annual flood damages without the project for each decade of the fifty year project life. The computations were performed with the U.S. Army Corps of Engineers computer program HEC 761-X6-27580. The results are displayed on Tables B31 and B32 for the first and second scenario respectively.

Annual flood damages were also estimated by decade with 30/60 project conditions. The results of these analyses are displayed for both scenarios on Tables B33 and B34.

The total flood damages by decade and the average annual equivalent damages both with and without the project are summarized for each of the two scenarios on Table B35.

Future flood damages were not estimated for commercial and industrial property. It is unlikely that there will be any significant growth of commercial or industrial property in the flood plain because of zoning restrictions.

Damage Susceptibility

None of the projected changes in the physical units in the flood plain are expected to change the susceptibility of structures and contents to flood damages. Most of the structures are of frame construction, so floodproofing by sealing walls is not considered technically feasible. Likewise, without the construction of the project, the hydrological characteristics of Conesus Lake are not expected to change significantly.

PROJECTION OF INCOME LOSSES

Since there is little business activity in the flood plain, there is no significant income loss as a result of businesses

being shut down due to flooding. A number of cottages along the lake shore are available for rent. During and after floods the use of these cottages is precluded. However, the cost of these income losses is included in the residential damages so it is not included as a separate damage category.

PROJECTION OF EMERGENCY COSTS

Since the number of residences and businesses in the flood plain are not expected to change significantly, emergency costs are expected to remain constant over the life of the project.

Table B31 - Flood Damages by Decade Without Project
Growth Scenario 1 - Minimal Chages in Flood Plain
Applicable Discount Rate = 7 3/8%
March 1981 Price Levels

Property Type	Time Period 1982	1992	2002	2012	2022	2032	Average Annual Equivalent
Residential							
Structures	80,200	80,200	80,200	80,200	80,200	80,200	80,200
Contents	19,600	25,800	32,700	39,600	41,000 1/	41,000	27,500
Commercial	12,800	12,800	12,800	12,800	12,800	12,800	12,800
Public & Other	2,800	2,800	2,800	2,800	2,800	2,800	2,800
Total	115,400	121,600	128,500	135,400	136,800	136,800	123,300

1/ Growth in content damages continues until 2013 (Pr.Yr. 31).

Table B32 - Flood Damages by Decade Without Project
Growth Scenario 2 - Significant Changes in Flood Plain
Applicable Discount Rate = 7 3/8%
March 1981 Price Levels

Property Type	Time Period 1982	1992	2002	2012	2022	2032	Average Annual Equivalent
Residential							
Structures	82,200	88,300	91,000[1/]	91,000	91,000	91,000	87,700
Contents	19,300	24,600	32,000	40,500	45,200	48,500	27,200
Commercial	12,800	12,800	12,800	12,800	12,800	12,800	12,800
Public & Other	2,800	2,800	2,800	2,800	2,800	2,800	2,800
Total	117,100	128,500	138,600	147,100	151,800	155,100	130,500

1/ Growth in the value of structure continues until 1995 and then remains constant.

Table B33 - Flood Damages by Decade with 30/60 Project
Growth Scenario 1 - Minimal Changes in Flood Plain
Applicable Discount Rate = 7 3/8%
March 1981 Price Levels

Property Type	Time Period 1982	1992	2002	2012	2022	2032	Average Annual Equivalent
Residential							
Structures	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Contents	800	1,200	1,400	1,800	1,800	1,800	1,200
Commercial	200	200	200	200	200	200	200
Public & Other	100	100	100	100	100	100	100
Total	4,500	4,900	5,100	5,500	5,500	5,500	4,900

Table B34 - Flood Damages by Decade With 30/60 Project
Growth Scenario 2 - Significant Changes in Flood Plain
Applicable Discount Rate = 7 3/8%
March 1981 Price Levels

Property Type	Time Period 1982	1992	2002	2012	2022	2032	Average Annual Equivalent
Residential							
Structures	3,400	3,500	3,600	3,600	3,600	3,600	3,600
Contents	800	1,100	1,400	1,800	1,900	1,900	1,200
Commercial	200	200	200	200	200	200	200
Public & Other	100	100	100	100	100	100	100
Total	4,500	4,900	5,300	5,700	5,800	5,800	5,100

Table B35 - Flood Damages by Decade With and Without Project

Property Type	Time Period 1982	1992	2002	2012	2022	2032	Average Annual Equivalent
GROWTH SCENARIO 1 1/							
Without Project	115,400	121,600	128,500	135,400	136,800	136,800	123,300
With Project	4,500	4,900	5,100	5,500	5,500	5,500	4,900
Damage Reduction Benefits	110,900	116,700	123,400	129,900	131,300	131,300	118,400
GROWTH SCENARIO 2 2/							
Without Project	117,100	128,500	138,600	147,100	151,800	155,100	130,500
With Project	4,500	4,900	5,300	5,700	5,800	5,800	5,100
Damage Reduction Benefits	112,600	123,600	133,300	141,400	146,000	149,300	125,400

1/ Growth Scenario 1 represents an increase in content values but no change in structural value.

2/ Growth Scenario 2 represents increases in both structural and content values as a result of increased demand for lakefront property.

OTHER COSTS OF USING THE FLOOD PLAIN

Other costs associated with the use of the flood plain were considered. However, none were found to be applicable to the flood problems on Conesus Lake and the solution proposed. The costs considered are described below.

FLOODPROOFING COSTS

In areas of high flood hazards, homeowners often use floodproofing measures to reduce the amount of damage which will result from a given flood stage. However, for floodproofing to be technically feasible and/or cost effective, the structures must be of certain types and flood levels must be within certain ranges. A complete discussion of the technical and economic feasibility of floodproofing is contained in the U.S. Army Corps of Engineers Hydrologic Engineering Center publication entitled Physcial and Economic Feasibility of Nonstructural Floodplain Management Measures (March 1978). Based on this study, the only possible method of floodproofing would be to construct small berms around the structures which occupy the shoreline. Since most of the structures are of frame construction, sealing of structure walls is not considered technically feasible. At an average cost of $3,000 per residence for the berms, the cost of floodproofing the 510 homes which are affected by the 1.0 percent chance of flood would exceed $1,530,000 which is more than twice the cost of the proposed project. Furthermore, the annual cost of floodproofing all homes affected by the 1.0 percent chance flood would be $135,800, (based on a replacement of berms in project year 25). This is greater than the estimated average annual equivalent flood damages to these homes. So floodproofing is obviously not economically efficient. Therefore, since floodproofing is not economically efficient. Therefore, since floodproofing is not economically attractive, it seems unlikely that homeowners would utilize it to reduce damages. Therefore, it appears unreasonable to consider the cost of floodproofing in an economic analysis.

NATIONAL FLOOD INSURANCE COSTS

The national costs of the flood insurance program is its administration. The administration costs are broken down into a cost per policy which includes agent commissions, policy servicing and claims adjustment. Since the proposed plan does not provide protection against the 12 percent change (100-year return period) flood, the number of policies written in the flood plain would remain unchanged. Therefore, the national costs of flood insurance would also remain unchanged and it is not appropriate to consider them in the analysis of net benefits.

MODIFIED COSTS

During this study there was no evidence of restrictions on property or structure usage as a result of flood hazards. Therefore, there are no modified usage costs associated with the flood plain.

LAND MARKET VALUE

Changes in the market value of land in the flood plain are not expected as a result of implementation of the project. Land use is not expected to change significantly, because most of the available land in the flood plain is already developed. Some intensification of land use might result from the project and the opening of Interstate 390. The economic aspects of this intensification was considered in the previous section on future flood damages. Major changes in the market value of land in the present flood plain is not expected to result from the project, because the project will not provide protection from the 100-year flood. Restrictions on development in the flood plain will continue, despite the project.

NED BENEFITS

The National Economic Development (NED) Benefits are computed from the information derived in the previous sections. For the proposed project (30/60 plan) benefits are solely derived from present and project inundation reduction benefits, which are the difference between flood damages without and with the project. The average annual equivalent damages with and without the project were displayed for two future growth scenarios on Table B35. The project costs and the project benefits for existing conditions and both future growth scenarios are displayed on Table B36. The net NED benefits are $41,600 for existing conditions, $51,000 for the first growth scenario and $58,000 for the second. The first scenario is based on maintaining current residence ownership, with growth in the value of contents based on increases in per capita income. The second scenario assumes that there will be some changes in residence ownership as a result of the opening of I-390 and that the new owners will undertake extensive renovation of some of the dwelling units in the flood plain.

The difference in the net NED benefits determined by the two future growth scenarios is significant. The second scenario would result in a net benefit 2 percent higher than the first. Although past history indicates the second scenario is reasonable, the economic environment in which that history was created no longer exists. Rapidly escalating fuel costs are making many people who work in rural areas reevaluate the attractiveness of living in outlying areas. Therefore, since the project is economically feasible on the basis of existing conditions and

Table B36 - Summary of Annualized NED Benefits and Costs for Project

	Existing Conditions	Growth Scenario 1 1/	Growth Scenario 2 2/
Flood Hazard Reduction Benefitss	109,000	118,400	125,400
Total Project Benefits	109,000	118,400	125,400
Project Costs	73,900	73,900	73,900
Net Benefits	35,100	44,500	51,500

1/ Growth Scenario 1 represents an increase in content values but no change in structural value.

2/ Growth Scenario 2 represents increases in both structural and content values as a result of increased demand for lakefront property.

both growth scenarios, the first scenario was chosen as representing the most defendable future and used for further analysis.

ECONOMIC EFFICIENCY

Three measures of economic efficiency were used to evaluate the proposed plan of improvement. They are: the benefit/cost (B/C) ratio, net discounted benefits, and the break-even year. Growth scenario 1 was used for this analysis.

The B/C ratio is the total ratio of average annual benefits to the total annual costs. The benefit cost ratio for the 30/60 plan is 1.60.

The net discounted benefits are the present value of benefits in excess of the projected costs and maintenance fees evaluated at the project interest rate of 7 3/8 percent. The net discounted benefits measure the present value of this project beneficial effects over the planning period. Net discounted benefits are $44,500.

Two break-even years were evaluated. The first was the year when undiscounted annual benefits exceeded annual charges. This was found to be the year 1988, which will be the 6th year of the project's life. The second break-even year was the year in which discounted benefits exceeded project charges. This was found to be the year 1991, which is the 9th year of the projects life.

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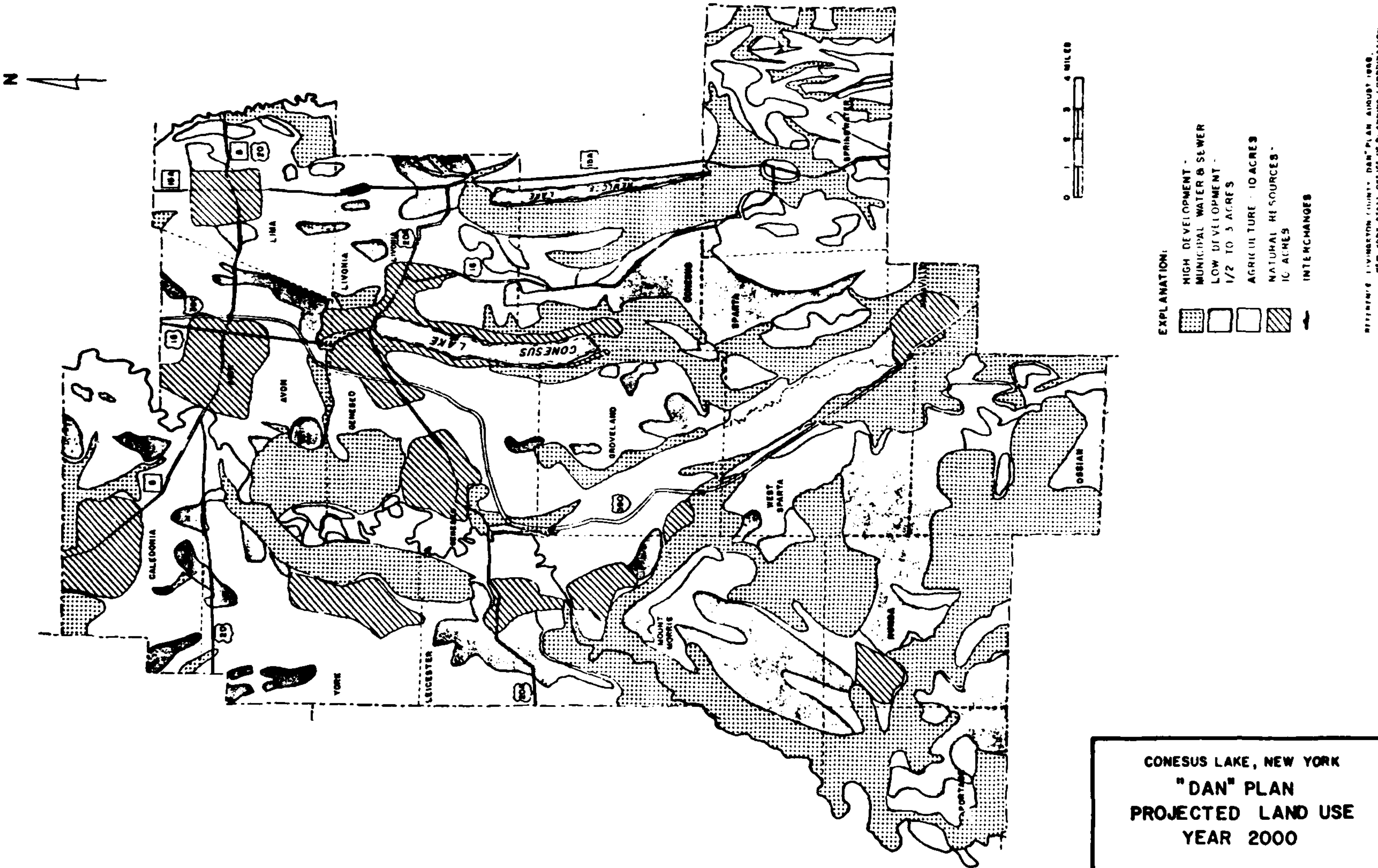


CONESUS LAKE, NEW YORK

"DAN" PLAN
PROJECTED LAND USE
YEAR 2000

U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE B-1

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX C
GEOTECHNICAL

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

CONESUS LAKE - LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
GEOTECHNICAL DESIGN
APPENDIX C

TABLE OF CONTENTS

CONESUS LAKE - LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
GEOTECHNICAL
APPENDIX C

TABLE OF CONTENTS (Cont'd)

FIGURES

TABLES

CONESUS LAKE - LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
GEOTECHNICAL
APPENDIX C

TABLE OF CONTENTS (Cont'd)

PLATES

COMPUTATIONS

CONESUS LAKE - LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
SECTION 205
APPENDIX C
GEOTECHNICAL

C1. REGIONAL GEOLOGY

C1.1 Physiography.

Conesus Lake is located in Livingston County, NY, and lies in the Erie-Ontario lowland. (See Figure C1.) This westernmost Finger Lake has a drainage area of 180.5 km^2. Conesus Lake has a length of 12.6 km and an average depth of 11.5 m. The mean elevation of the area of interest is 249.3 m. The Finger Lakes have an origin in deeply scoured glacial valleys with thick unconsolidated sediments overlying bedrock. The area is composed of sediment filled U-shaped glaciated river valleys. The basin of Conesus Lake is flat to the north and becomes steeper and higher towards the middle of the lake. As is typical for the Finger Lakes, the deepest portion is in the south basin.

C1.2 Surficial Geology.

The most prominent geologic features of the project are a result of Pleistocene glaciation, which began about 1,000,000 years ago. As the ice receded, a series of short lived postglacial lakes formed and resulted in a thick layer of glacial drift that covered sedimentary strata of Ordovician, Silurian and Devonian age. The soils of the Conesus Lake basin are highly variable. In general the soils range from silts to fine sands and are derived from lacustrine deposition, lodgement tills, ground morains, and alluvium. Lacustrine deposits and alluvial soils are dominant throughout the project.

C1.3 Bedrock Geology.

The Devonian rocks found in the Conesus Lake basin indicate that the area was a part of an inland sea. The lithologies found in the basin (listed from youngest to oldest) are (1) Java Group - Hanover Shale, (2) West Fall Group - Nunda Formation, West Fall Formation - Gardeau Formation, Lower Beers Hill Shale, Dunn Hill, Millport and Moreland Shales, (3) Sonyea Group - Cashaqua Shale and (4) Genesee Group and Tully Limestone - the West River Shale. For the bedrock geology of the Finger Lakes Region, see Figure C2.

C1.4 Structural Geology.

The sedimentary rocks of the Conesus Lake region are nearly horizontal with a slight dip to the south of 1° or 17 m/km. Jointing in the rocks is common.

C1.5 Ground Water.

There are no specific data available on the ground water at this time. However, the marshlands at the southern end of the lake and surrounding areas are indicative of a relatively high water table.

C1.6 Seismicity.

The Conesus Lake project is located in an area of relatively moderate to high seismic activity (Zone 3, Figure C3). Based on its proximity (25 miles east) to the Clarendon-Linden Fault, we conservatively propose a design earthquake with a resultant horizontal ground motion of 10 percent (.1 g) gravity at the foundation level of the outlet control structure. However, ground rupture or landslides are not anticipated as a part of this project.

C2. LOCAL GEOLOGY

C2.1 Surficial Geology.

The upland surficial deposits in the project area are mainly Wisconsin Glaciation lake deposits, tills, and recent alluvium. Lacustrine and recent alluvium are dominant along Conesus Creek. In general, the soils consist of silts, fine sands, sandy gravels and clay.

C2.2 Bedrock Geology.

The bedrock in the project area is the West River Shale, Genundewa Limestone, and the Geneseo Shale of Devonian age. In the project vicinity the bedrock generally is not encountered as it is covered by several tens of feet of overburden.

C2.3 Fluvial Processes.

Conesus Creek presently appears to be carrying only suspended particles that have failed to settle into the lake. The present channel bottom contains little coarse fragments and what has been observed is mainly angular gravel that probably has been derived from the parent glacial deposits. The angularity of the fragments indicate that little or no stream transport has occurred.

The anticipated channel improvements will have little effect on the current fluvial processes. The stream velocities will range from 2 to 4 fps upstream of the proposed outlet structure to 2 to 3 fps downstream of the structures. The reach from the outlet structure (Sta. 106+40) to the downstream end of the project (Sta. 51+10) is about 5,300 feet. The relatively slow velocities and required 10 cfs discharge appear minimal to carry a significant sediment load.

C3. SUBSURFACE EXPLORATIONS

C3.1 Drilling by Others.

Four borings were taken by New York State Department of Transportation in 1954 for the Route 20A bridge. The bridge crosses Conesus Lake Outlet at the upper limit of the project area, north of Conesus Lake. The boring logs indicate the soil generally is a silt with some sand and gravel. Bedrock, which appeared to be a shale, was encountered at a depth of 82 feet below ground surface. Those boring locations are shown on Plate C4.A and displayed on a geologic section at the outlet control structure on Plate C4.E.

C3.2 Field Strip Sampling.

Channel bank slopes were stripped in three areas as shown on Plate C4.A. Those strips are designated as FS 80-1, FS 80-2, and FS 80-3. The material was sampled from these slopes and subjected to laboratory testing to obtain soil index properties, classification and engineering properties. The laboratory test results are shown on Figures C4 through C8. In general, those samples were classified as silts and fine sands (SM).

C3.3 Hand Auger Borings.

At this time a drilling (hand auger borings) and sampling program has been planned and will be conducted in two phases. Those boring locations are shown on Plates C1 through C4.A. To date, Phase I of the Boring and Sampling Program has been completed. Field classifications were made on the samples obtained from these borings. In general, it has been found that silts (ML) and fine sands (SM) overlay clay (CL) along the length of the project. However, at some locations gravelly sandy fill was encountered.

C3.4 Test Pits.

As a result of the difficulty encountered in drilling some of the Phase I auger borings (at locations where fill was encountered), four test pits have been dug to a depth of 10 feet (locations shown on Plates C1 and C4.A). Field classifications of samples obtained from these test pits indicate that sandy gravelly fill overlay silty sands (SM) and clay (CL) or gravel (GW).

C4. GEOTECHNICAL DESIGN

C4.1 General.

The plates (C1 through C4.E) that show geologic profiles and cross sections were prepared from preliminary and limited data. The data obtained from the field strip locations, NYSDOT borings at Route 20A bridge, Phase I hand auger borings, and test pits has been extrapolated throughout the entire project. Phase II of the drilling (hand auger borings), sampling, and a laboratory testing program (for Phase I and Phase II hand auger borings and test pits) will be performed prior to construction to confirm the presumptive values that have been used for the current design. Channel sideslopes for the project are IV: 3H and were selected primarily for maintainability. This

slope results in a very conservative design which would still provide a suitable factor of safety under any conceivable reasonable variation in foundation material that would be expected in this region.

C4.2 Presumptive Values for Geotechnical Design.

Presumptive values used for the design were derived from the field classifications of the sampling obtained from the hand auger borings and test pits, boring data for the Route 20A bridge (furnished this office by NYSDOT), and samples from the three field strip areas that were subjected to laboratory testing. The soils have been classified both by NYSDOT classification and unified soil classification system. The data from these borings contained sufficient information to develop presumptive values for preliminary design of the sideslopes of the channel and to determine the stability of the sheet pile outlet control structure. Based upon the above soil classifications the following table was developed.

Table C1 - Presumptive Values for Design

	Material Properties Presumptive			
Soil Classification	dry (pcf) 1/	sat (pcf) 1/	Ø (°) 2/	C (psf) 3/
Silty Sand, Trace Gravel	110 1/	115	26	0
Silts (non-plastic)	110	115	26	0
Clay (med. stiff)	98	125	0	700
Silty Gravel	118	123	32	0
Gravelly Sand	112	117	32	0

1/ Extracted from "Basic Soils Engineering," Hough, B. K., 2nd edition 1969, pg. 35, Table 2-3.

2/ Extracted from "Basic Soils Engineering," Houch, B. K., 2nd edition 1969, pg. 181, Table 6-1.

3/ Extracted from "Foundation Analyses and Design," Bowles, J. E., 1980, pg. 126, Table 3-3.

C4.3 Design for Channel Sideslopes.

C4.3.1 General - The major features of this project consist of widening and deepening the existing channel (from Route 20A bridge downstream to end of project widening will be on the west bank only), the construction of a new diversion channel, the construction of a downstream diversion channel, and the construction of a control structure. The location of those features are shown on Plates C1 through C4.E. The upstream diversion channel will be constructed from station 114+00 northward to the confluence of the existing channel (approximately station 111+00). The downstream diversion channel will be from station 90+00 northward to station 85+00.

C4.3.2 Slope Design - Channel sideslopes of 1V: 3H were conservatively designed in order to provide a suitable factor of safety under any conceivable reasonable variation in the foundation material that would be expected in this region. However, with the additional information obtained from the hand augers and test pits a less conservative sideslope IV: 2.5H will be considered for the final channel design and has been checked for slope failure. The modified Bishops Method for slip circle analysis produced the critical case and used the Slope II Computer Program put out by the Boeing Computer Services, Inc. The presumptive values presented in Table C1 above were used as input into the computer program to determine the factor of safety against failure. Therefore, for IV: 2.5H slopes and a typical failure slide a factor of safety of 1.7 was achieved, and the slopes are stable.

C4.4 Channel Slope Protection.

C4.4.1 General - The majority of the channel slope protection will consist of grass because of relatively slow velocities (2 to 3 feet/second). However, some reaches will require bedding and 12-inch riprap protection. Where riprap is required, it will be on the slopes for a height 4.0 feet above the channel bottom. Riprap will be needed because grass will not grow underwater and the stream velocity will undercut the slope. Those reaches requiring riprap protection are from station 105+60 to 106+40 both sides, from 108+00 to 112+00 left side, and station 113+20 to 113+70 both sides. The bridge area will not be riprapped as NYSDOT has placed their standard riprap around the lower abutments. Riprap will be placed on the bottom and side slopes downstream of the control structure to the existing riprap for NYS Route 20A bridge.

C4.4.2 Riprap Design - Riprap was designed for a maximum stone size of 12 inches in a 12-inch layer. The design shear for 12-inch riprap on a 1V: 3H side slope is 2.0 psf. The velocity (3.9 fps) and depth (5 feet) of water in the channel produced a boundary shear of .34 psf. Therefore, the 2.0 psf design shear for 12-inch riprap is five times greater than the .34 psf boundary shear. However, minimum layer thickness for riprap is 12 inches. The design calculations were performed in accordance with ETL 1110-2-120, "Additional Guidance for Riprap Channel Protection," Inclosure 1, and those calculations are shown at the end of the appendix. Riprap will be placed in those reaches where scour cannot be tolerated, i.e., immediately upstream of the Route 20A bridge and downstream of the concrete apron. The riprap slope protection was designed to protect the slope from the toe to an elevation of 818.5. The slope above that elevation will be grassed. Riprap and bedding placement will be performed in accordance with EM 1110-2-1601, "Hydraulic Design of Flood Control Channel," Appendix III, Plate 37, Method A, and Figure C9. Riprap end protection will be placed in accordance with EM 1110-2-1601, Plate 38, Method C. Typical sections for riprap placement upstream of the control structure are shown at station 109+50 (Plate C4.D) and station 112+00 (Plate C4.D).

C4.4.3 Bedding Material - The bedding material was designed in accordance with EM 1110-2-1901, "Soil Mechanics Design, Seepage Control," February 1952. The bedding material was designed to be fine enough to prevent passage

of the soil material through the bedding into the riprap. In order to accomplish this the bedding has the following properties: (1) the ratio of the 15 percent size of the bedding to the 15 percent size of the soil (.01 mm) must be greater than 5; (2) the ratio of the 15 percent size of the riprap (140 mm) to the 15 percent size of the bedding material must be greater than 5; (3) the ratio of the 15 percent size of the bedding material to the 85 percent size of the soil (5 mm) must be less than 5; (4) the ratio of the 15 percent size of the riprap to the 85 percent size of the bedding must be less than 5; (5) the grain-size curve of the bedding is roughly parallel to that of the soil. The calculations are shown at the end of this appendix.

C4.5 Channel Grade Protection.

Channel grade protection above and below the outlet structure was considered because of increased flow velocities and possible turbulence. However, the present channel bottom does not appear to be eroding and since the channel will be widened to 60 feet upstream of the structure and 35 feet downstream of the structure and deepened slightly, little erosion is anticipated, and what little might occur can be tolerated.

C4.6 Design for Control Structure.

The detailed design for the control structure is discussed in the Design Appendix. The soil parameters that provide the basis for the stability design of that structure are presented in Table C1 above.

C4.7 Construction Materials Survey.

C4.7.1 General - A materials survey was performed in March 1981 to determine possible material sources for the construction of the project. The survey consisted of a file search in which the following were considered: an analysis of the results of quarry investigations, an analysis of laboratory test results, the evaluation of available service records, and the determination of interest in producing the required materials on the part of pit or quarry operators.

C4.7.2 Material Types and Gradations.

C4.7.2.1 Design - A preliminary design for a local flood protection project consisting of channelization and the construction of a control structure. Stone materials required to construct this project consist of coarse and fine aggregates for concrete and bedding/filter for 12-inch riprap. Stone materials may have an elongation ratio not greater than 3: 1. All stones shall be predominantly angular in shape. Not more than 25 percent of the stones reasonably well distributed throughout the gradation shall have a length more than 2.5 times the breadth or thickness. They are described below.

C4.7.2.2 Fine Aggregate for Concrete - The fine aggregate for concrete will be in accordance with ASTM C33 and the gradation shall fall within the limits below and shown on Figure C12.

Fine Aggregate for Concrete
ASTM C-33

Sieve Designation U.S. Standard Square Mesh	Percent Finer by Weight
3/8-inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10
No. 200 (wet)	0-3

C4.7.2.3 Bedding/Filter for Riprap - This material will be a reasonably well-graded product conforming to the gradation limits shown below and on Figure C13.

Bedding/Filter for Riprap

Sieve Designation U.S. Standard Square Mesh	Percent Finer by Weight
6 inches	100
2 inches	65-100
1 inch	50-100
3/8-inch	22-70
No. 4	0-60
No. 40	0-25
No. 200	0-5

C4.7.2.4 Riprap - This material will consist of a reasonably well-graded product having a minimum weight of 5 pounds and a maximum weight of 84 pounds as shown below and on Figure C14.

12-Inch Riprap

Percent Lighter By Weight	Limit of Stone Weight in Pounds
100	84-34
50	25-17
15	12-5

C4.7.3 Material Weight.

A specific gravity (SSD) of 2.56 (160 pcf) was used to compute the stone sizes for riprap. The concrete will be designed for an average weight of 150 pcf. A variation in specific gravity equal to $\pm$ 5 percent (2.43 to 2.69) is acceptable.

C4.7.4 Material Quality.

C4.7.4.1 General - Quality requirements for each material type are discussed below. Riprap, bedding stone, and aggregates for concrete have been subjected to the tests established by Ohio River Division Laboratories, Cincinnati, OH. Test No. P-11, "Riprap and Breakwater Stone Evaluation" includes a suite of tests to determine stone durability. Crushed materials, coarse and fine aggregates for concrete have been subjected to a suite of tests, "Elementary Acceptance Tests of Fine Aggregate for Civil Works (C-21)" and "Elementary Acceptance Tests of Coarse Aggregates for Civil Works (C-22)" were performed to determine the suitability of crushed materials and aggregates for concrete. Several sources contain excessive chert content that is potentially chemically reactive and are not listed as possible sources for this project. However, low alkali cement will be required for those sources should they be proposed and found acceptable. EM 1110-2-2000, "Standard Practice for Concrete," appendices will be followed regarding chert content.

C4.7.4.2 Coarse and Fine Aggregates for Concrete - These materials will be a sound, hard, durable material that is produced from a crushed product and shall be free from cracks, seams, organic and deleterious materials. Aggregates that contain 5 percent or more of potentially chemical reactive chert will require low alkali cement. Aggregates that contain a combined total of 20 percent or more of potential chemical reactive chert will not be permitted. Coarse aggregates will contain sharp faces, and shall be free of laitence (washing of coarse aggregates may be required). Fine aggregates may be either natural (glacial origin) or manufactured sand (crushed limestone, dolomite or crushed conglomerates).

C4.7.4.3 Riprap and Bedding/Filter for Riprap - The stone to be used for these purposes shall be free from significant cracks, seams, and overburden spoil. The stone materials which are suitable for these products must not show significant breakdown in the freeze-thaw or wet-dry tests.

C4.7.5 Material Sources.

C4.7.5.1 General - Fine and coarse aggregates for concrete, bedding for the concrete apron, riprap and bedding/filter for riprap can be produced from the sources listed in the Summary of Sources, Plate C11. It is emphasized that all known quarries are not listed for this project. However, the listed sources are the more viable sources.

It is possible that all material shown under "proposed use" on Plate C12 for those sources may not be suitable. The right will be reserved in the specifications to reject unsuitable materials from certain localized areas, zones, strata channels or stockpiles.

Selective quarrying will be required for the production of riprap. The specification will require that shale and other undesirable materials will be excluded by adequate processing.

C4.7.5.2 Sources - Seven convenient sources are capable of producing the required materials. They are located within a 41-mile radius of the

project and will be transported by truck. Concrete will be by ready-mix trucks. Material source information for each material type relating the number of possible sources and distance from the project site follows.

C4.7.5.2.1 Coarse and Fine Aggregates for Concrete. Seven sources within a 41-mile radius.

C4.7.5.2.2 Riprap and Bedding/Filter for Riprap. Six sources within a 31-mile radius.

C5. CONSTRUCTION CONSIDERATIONS

C5.1 Waste Materials.

C5.1.1 General - In general, all excavated materials from virgin cuts will be wasted as there is no need for soil borrow. Waste areas will be furnished through local cooperation and sponsors. Excavation for channelization will result in the excavation of wet to saturated materials. Therefore, those materials will be spread out to dry along the banks just beyond the excavation limits. These materials have been determined by environmentalists as nonpolluted.

C5.2 Ground Water.

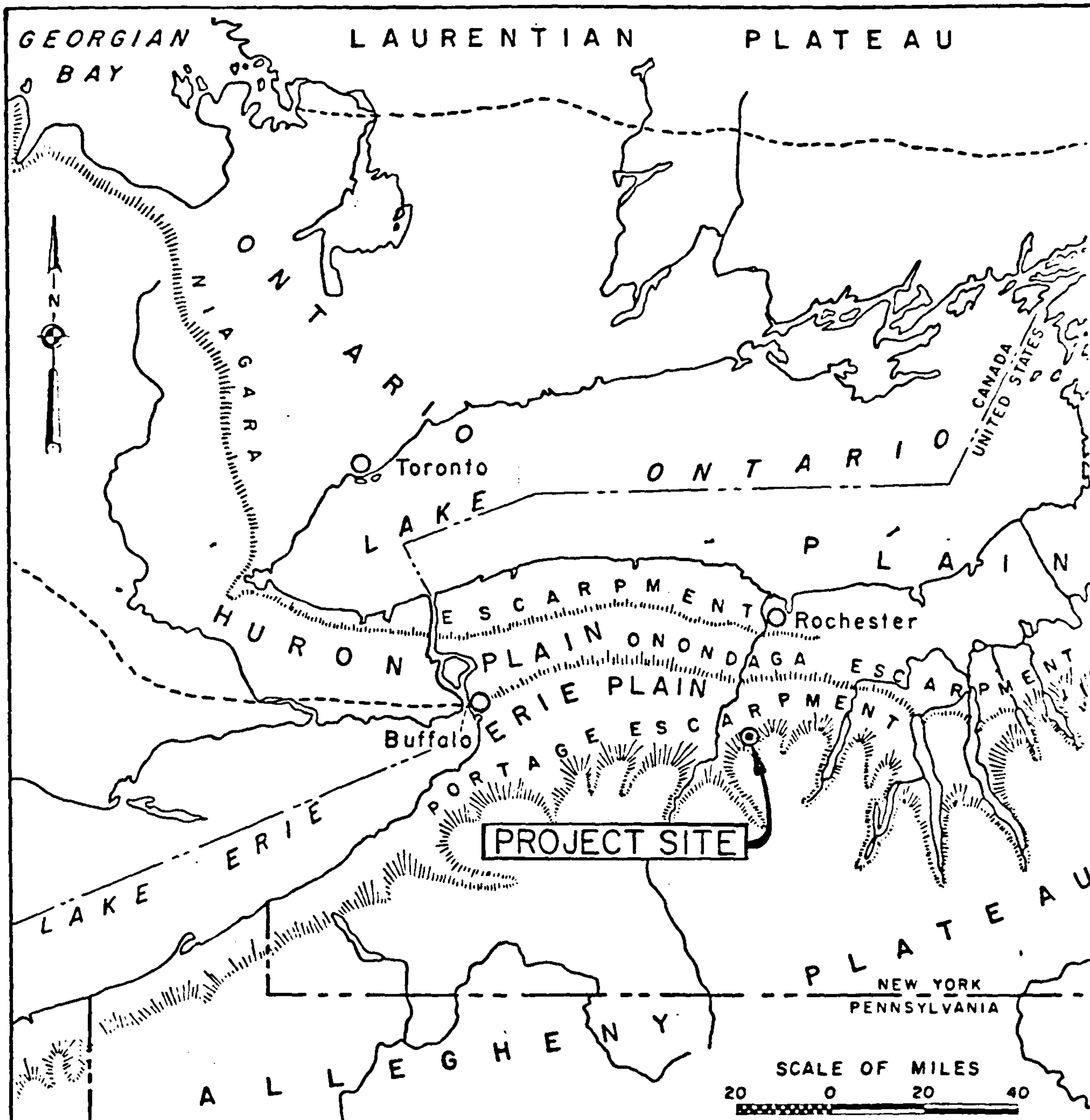
There is no specific data on the ground water at this time. However, visual examination of the hand auger and test pit samples indicate that the soil becomes wet or saturated close to the ground surface (see Plates C4.C, C4.D, and C4.E).

C5.3 Control Structure.

The control structure will be constructed using sheet pile driven to the designed depths. Dewatering for its construction will not be required. However, for the placement of the concrete sill (30 yds^3), the concrete will be placed in the dry. The water must be permitted to flow continuously, so some diversion will be planned.

C5.4 Channel and Sideslope Excavation.

The channel will be excavated to the depth shown on the drawings and the side slopes will be shaped to 1V on 3H slope. The 1V on 3H slopes will facilitate future maintenance. However, a slope stability analysis indicates that a IV: 2.5H sideslope is safe with a factor of safety of 1.7 for a typical failure. Therefore, prior to construction this slope will be recommended for incorporation into the final design plans. The slope will reduce the amount of excavation required and will still facilitate future maintenance.



SKETCH MAP OF PHYSIOGRAPHIC DIVISIONS IN THE LAKE ONTARIO – LAKE ERIE REGION

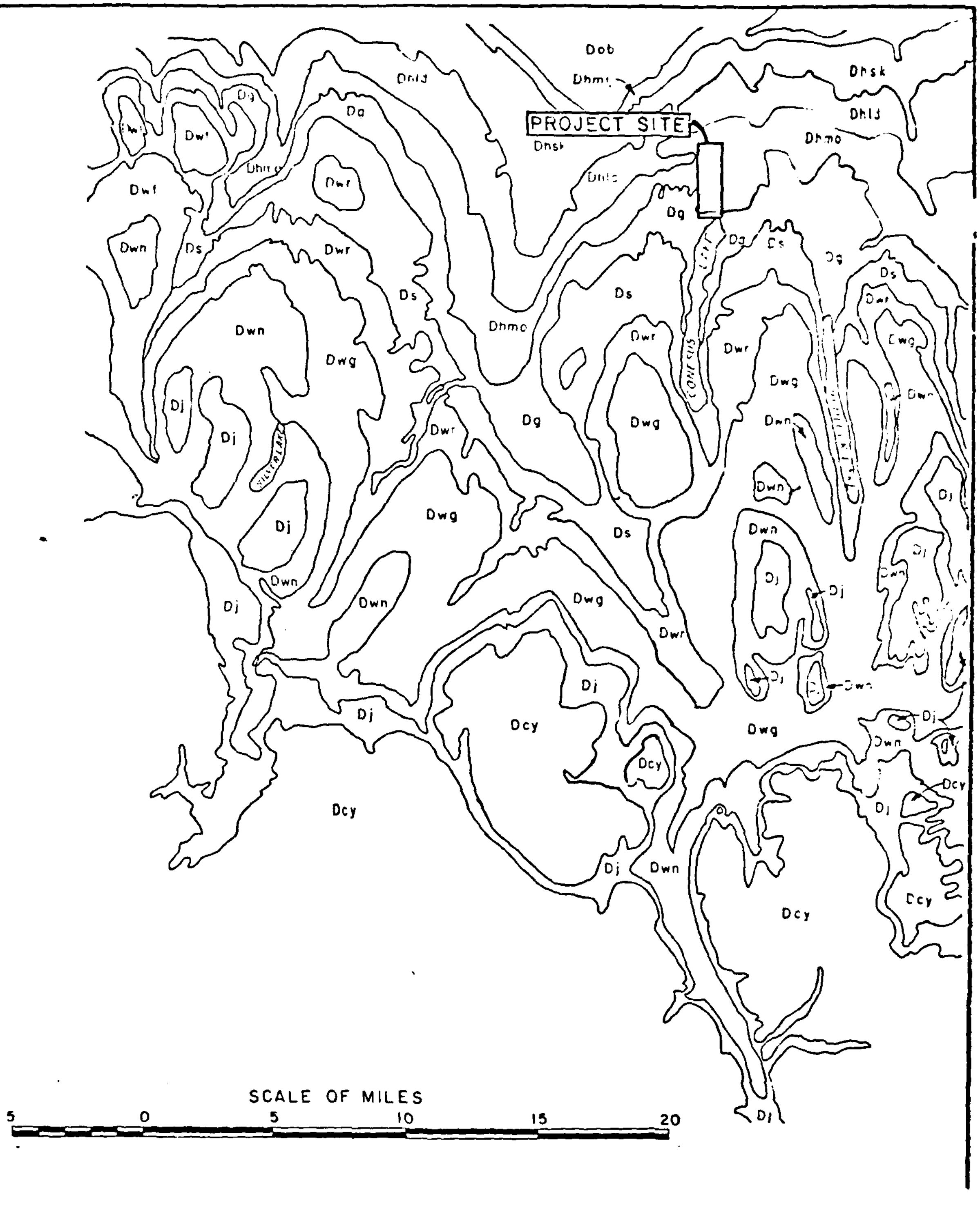
KINDLE, E.H. AND TAYLOR, F.B., 1913, DESCRIPTION OF THE NIAGARA QUADRANGLE (N.Y.): U.S. GEOL. SURVEY GEOL. ATLAS, FOLIO 190

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

PHYSIOGRAPHIC DIVISIONS

SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT BUFFALO
1981

FIGURE C1



VICINITY MAP

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

BEDROCK GEOLOGY OF FINGER LAKES REGION

SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT BUFFALO
1981

FIGURE C2

LEGEND FOR GEOLOGIC MAP

CANADAWAY GROUP

DCY	MACHIAS FORMATION: SHALE, SILTSTONE; RUSHFORD SANDSTONE; CANA-DEA, CANISTEO AND HUME SHALES, CANASERAGA SANDSTONE; SOUTH WALES AND DUNKIRK SHALES.

JAVA GROUP

Dj	WISCOY FORMATION: SANDSTONE, SHALE; HANOVER AND PIPE CREEK SHALES.

WEST FALLS GROUP

Dwf	ANGOLA AND RHINESTREET SHALES
Dwn	NUNDA FORMATION - SANDSTONE, SHALE
Dwg	WEST HILL AND GARDEAU FORMATIONS - SHALE, SILTSTONE; RORICKS GLEN SHALE; UPPER BEERS HILL SHALE; GRIMES SILTSTONE.
Dwr	LOWER BEERS HILL SHALE; DUNN HILL, MILLPORT, AND MORELAND SHALES.

SONYEA GROUP

Ds	CASHAQUA AND MIDDLESEX SHALES.

GENESEE GROUP AND TULLY LIMESTONE

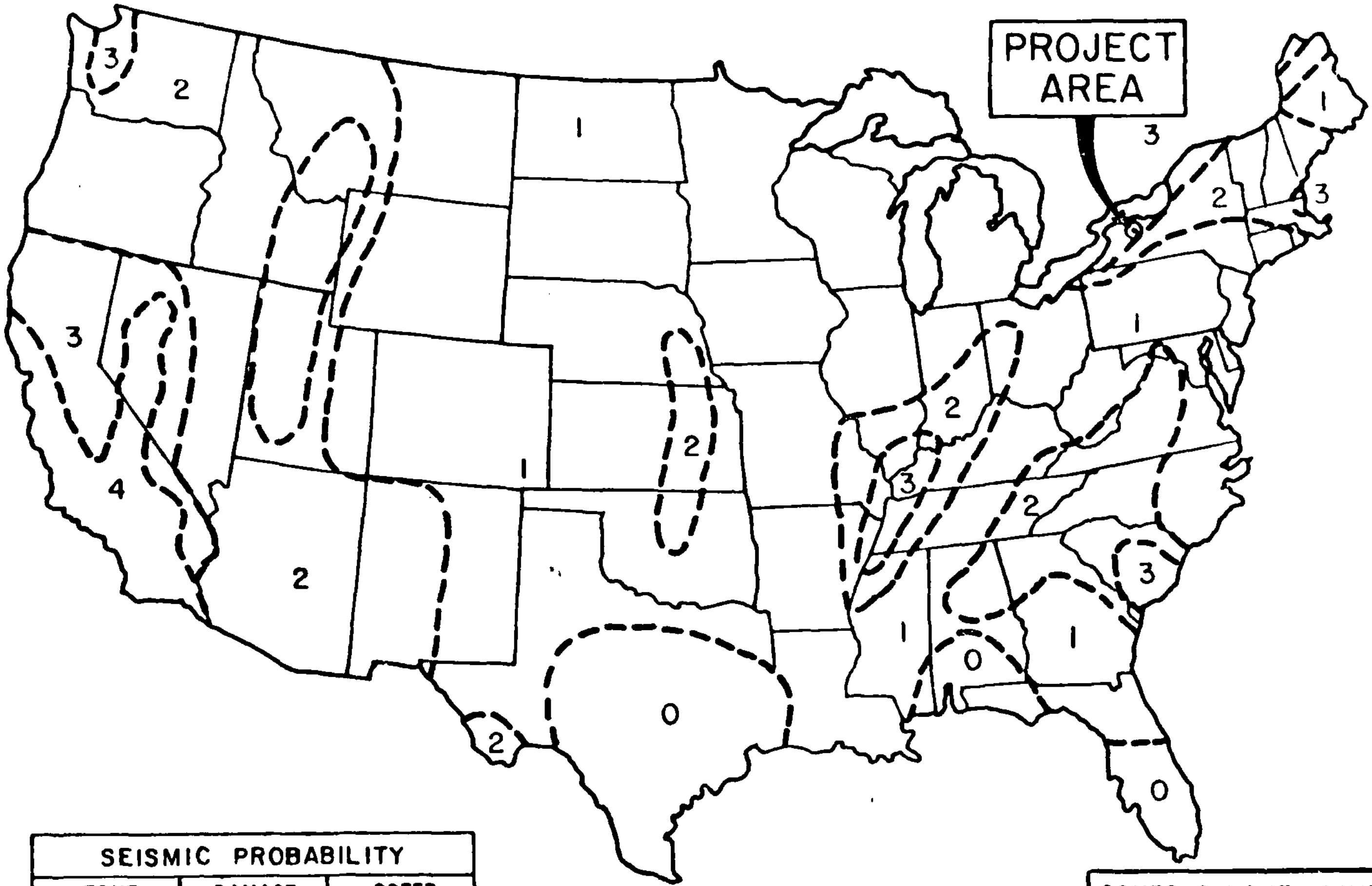
Dg	WEST RIVER SHALE; GENUNDEWA LIMESTONE; PENNYAN AND GENESEO SHALES; ALL EXCEPT GENESEO REPLACED EASTWARDLY BY ITHACA FORMATION - SHALE, SILTSTONE AND SHERBURNE SILTSTONE.

HAMILTON GROUP

Dhmo	MOSCOW FORMATION - WINDOM AND KASHONG SHALES, MENTETH LIMESTONE MEMBERS.
Dhld	LUDLOWVILLE FORMATION - DEEP RUN SHALE, TICHENOR LIMESTONE, WANAKAH AND LEDYARD SHALE MEMBERS, CENTERFIELD LIMESTONE MEMBER.
Dhsk	SKANEATELES FORMATION - LEVANNA SHALE AND STAFFORD LIMESTONE MEMBERS.
Dhmr	MARCELLUS FORMATION - OATKA CREEK SHALE MEMBER

ONONDAGA AND BOIS BLANC LIMESTONE

Dob	ONONDAGA LIMESTONE - SENECA, MOREHOUSE (CHERTY), AND CLARENCE LIMESTONE MEMBERS, EDGE CLIFF CHERTY LIMESTONE MEMBER, LOCAL CORAL BIOHERMS; BOIS BLANC LIMESTONE-SANDY. THIN, DISCONTINUOUS.



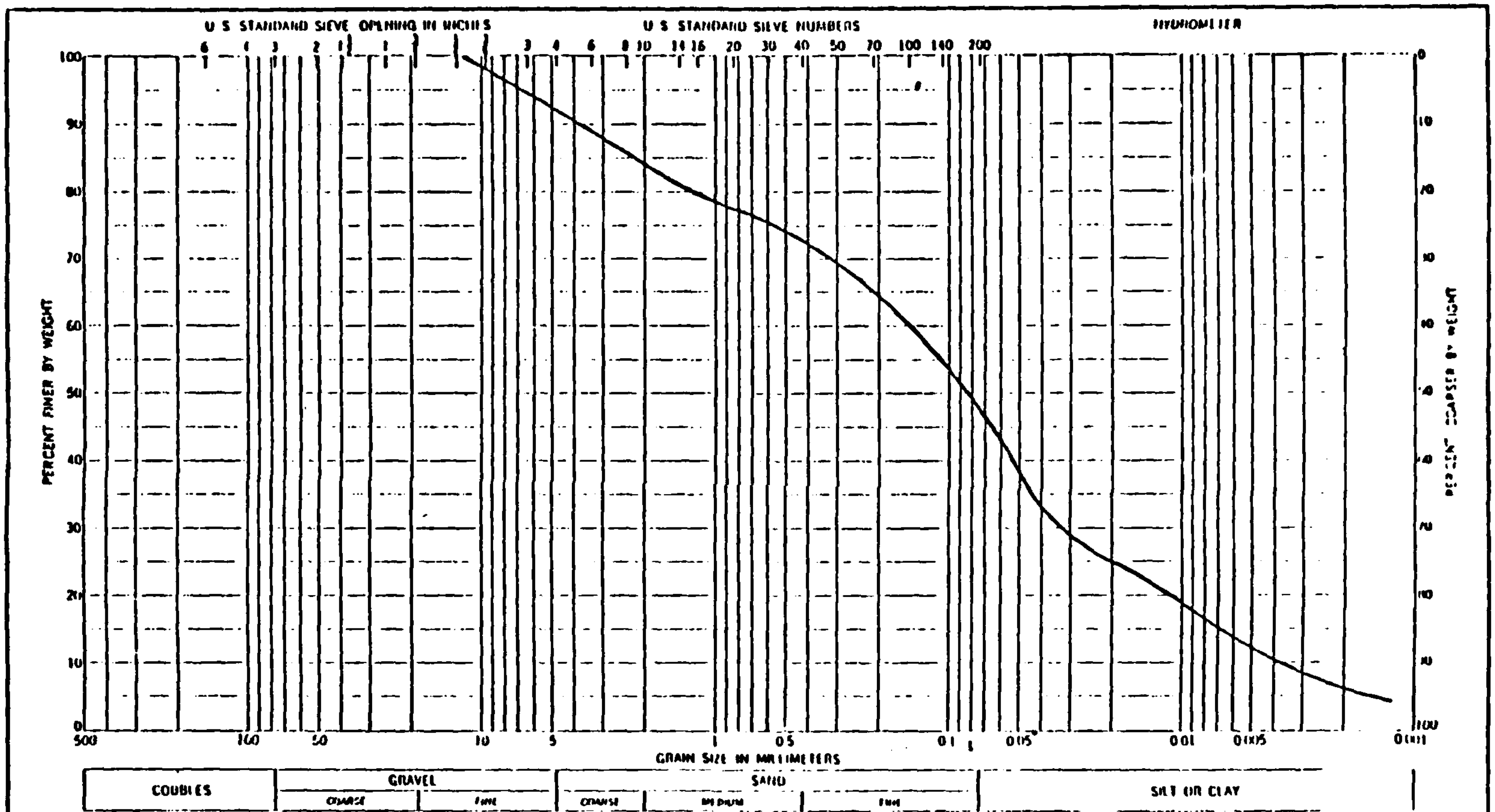
SEISMIC PROBABILITY		
ZONE	DAMAGE	COEFF.
0	NONE	0
1	MINOR	0.025
2	MODERATE	0.05
3	MAJOR	0.10
4	GREAT	0.15

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

SEISMIC RISK ZONES

SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT BUFFALO

FIGURE C3



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
209		SM - SAND and SILT, little clay, trace gravel		18.0	15.0	3.0

Project Conesus Lake Outlet

Corp of Engineers - Buffalo

Area

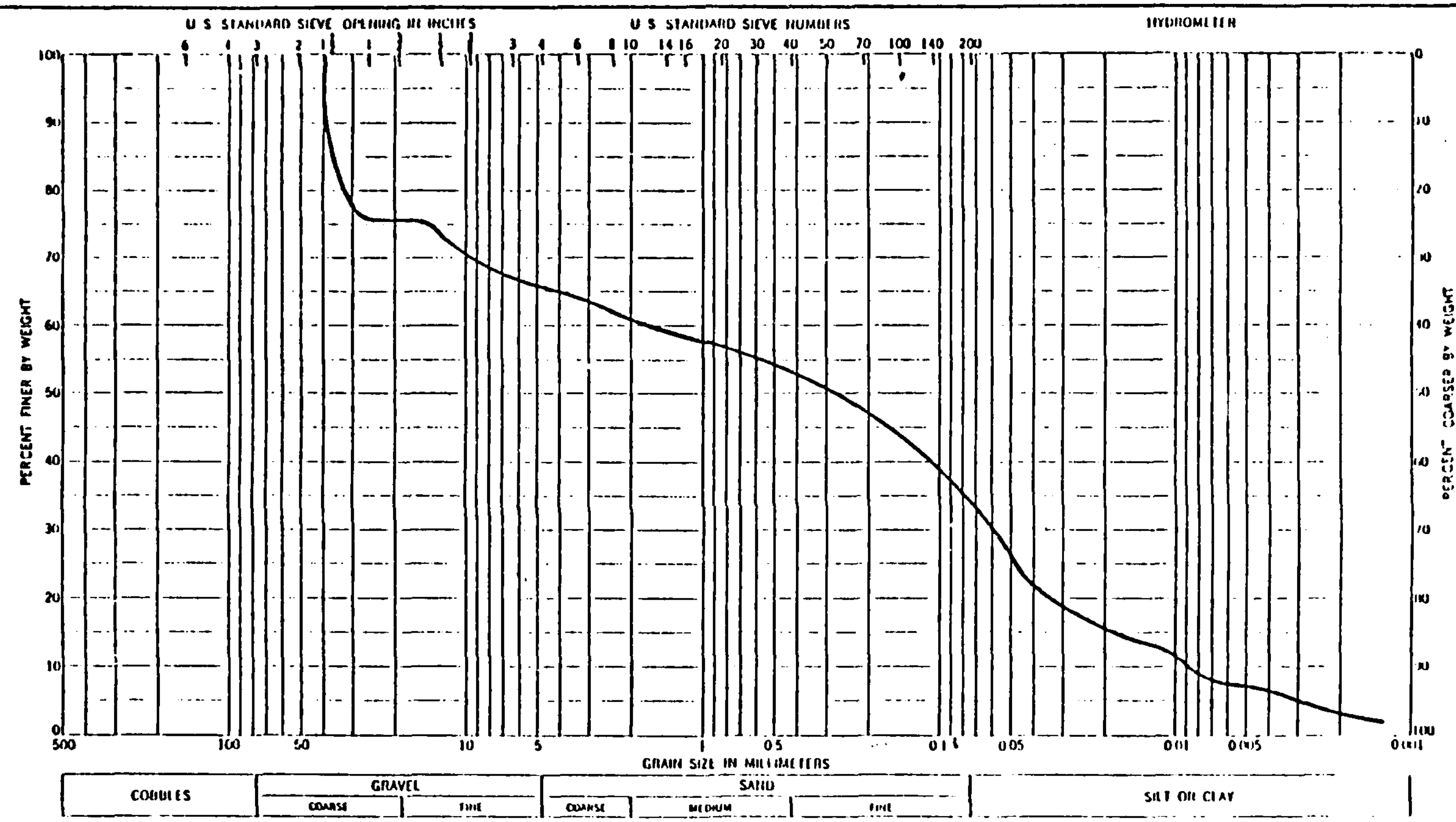
Boring No FS 80-1 #1

Date 3/2/81

GRADATION CURVES

ENG FORM 1 MAY 63 2087

FIGURE C4



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
210		SM - SAND and SILT, little clay, trace gravel		16.0	15.0	1.0

Project Conesus Lake Outlet
Corp of Engineers - Buffalo

Area

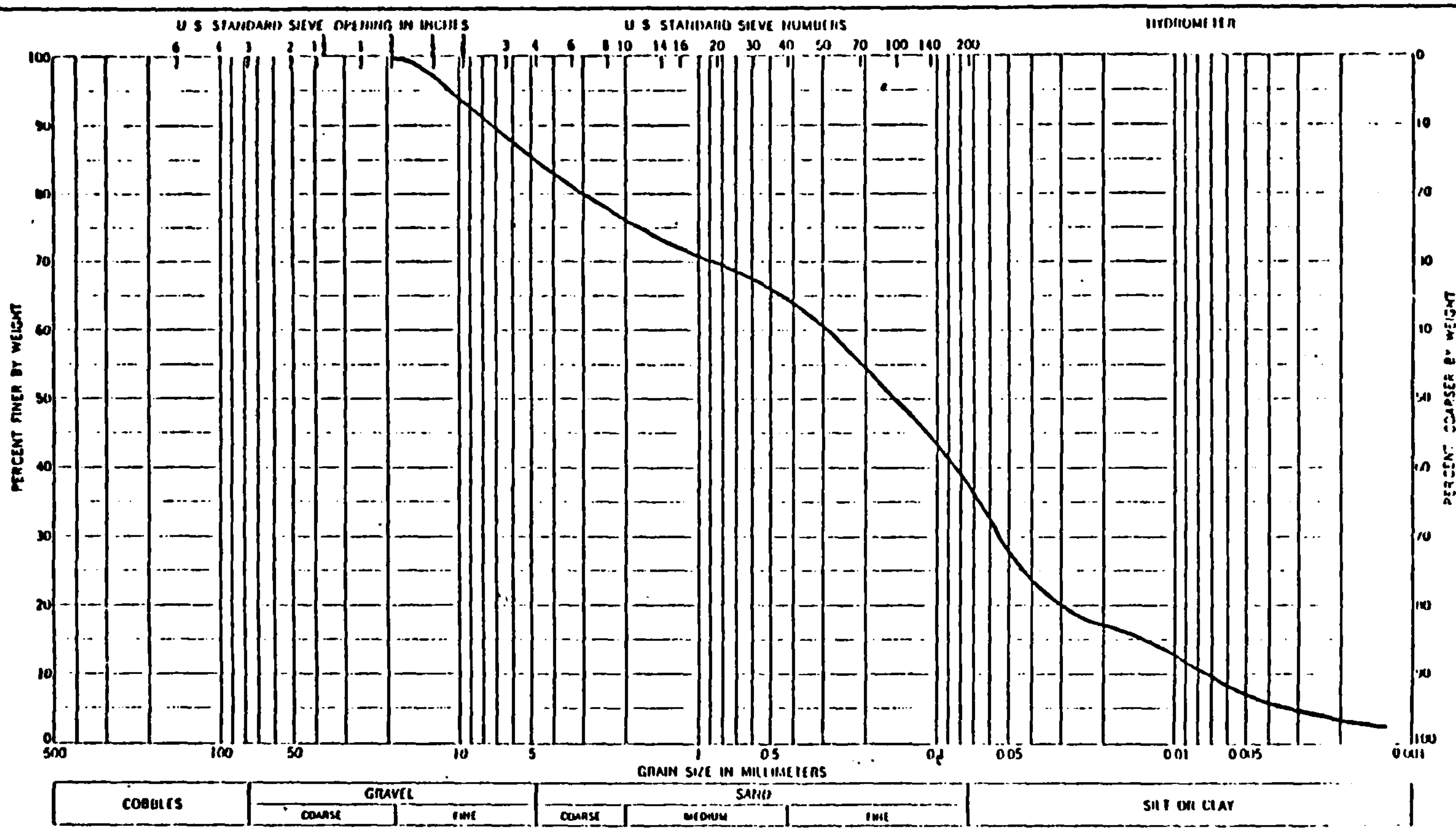
Boring No. FS 80-1 #2

Date 3/2/81

GRADATION CURVES

ENG FORM 1 MAY 63 2087

FIGURE C5



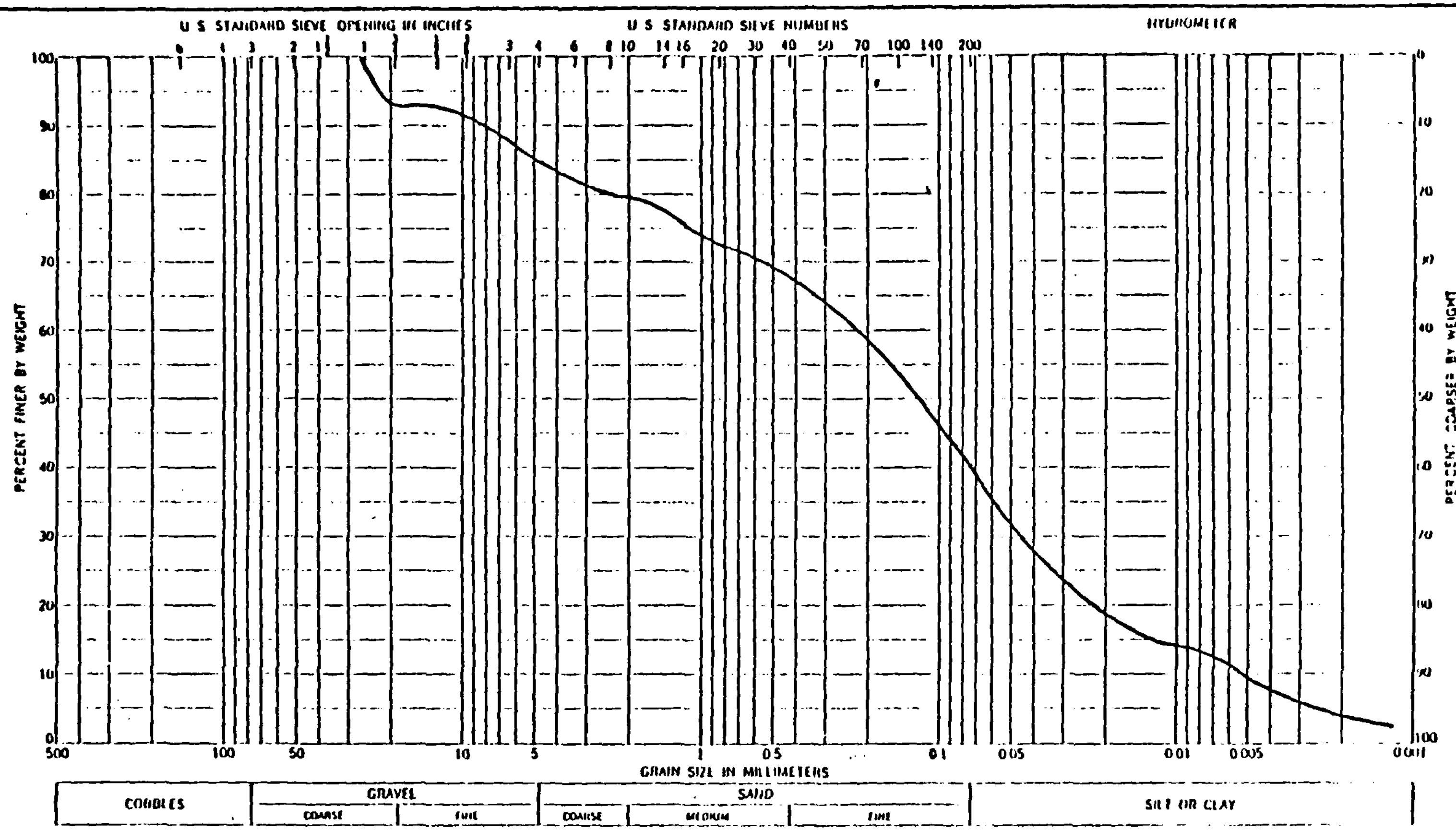
Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
211		SM - SAND, some SILT, little gravel, trace clay		16.0	15.0	1.0

Project: Conesus Lake Outlet
Corp of Engineers - Buffalo
Area:
Boring No: FS 80-1 #3
Date: 3/2/81

GRADATION CURVES

ENG FORM 1 MAY 63 2087

FIGURE C6



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
212		SM - SAND, some SILT, little gravel, trace clay		17.0	17.0	0

Project Conesus Lake Outlet
Corp of Engineers - Buffalo

Area

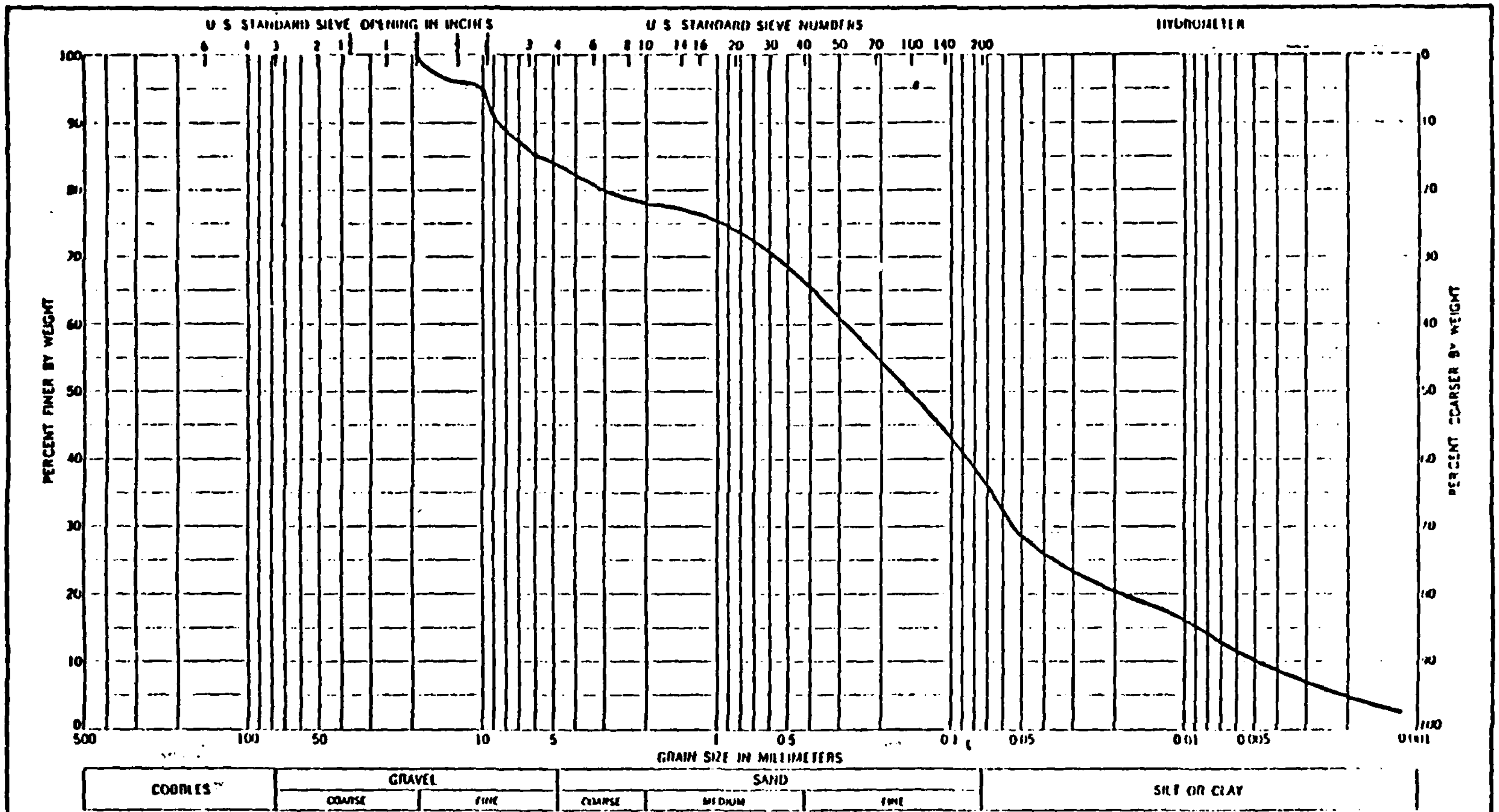
Boring No FS 80-2 #1

Date 3/2/81

GRADATION CURVES

ENG FORM 1 MAY 63 2087

FIGURE C7



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
213		SM - SAND, some SILT, little gravel, little clay with organic matter		36.0	28.0	8.0

Project Conesus Lake Outlet

Corp of Engineers - Buffalo

Area

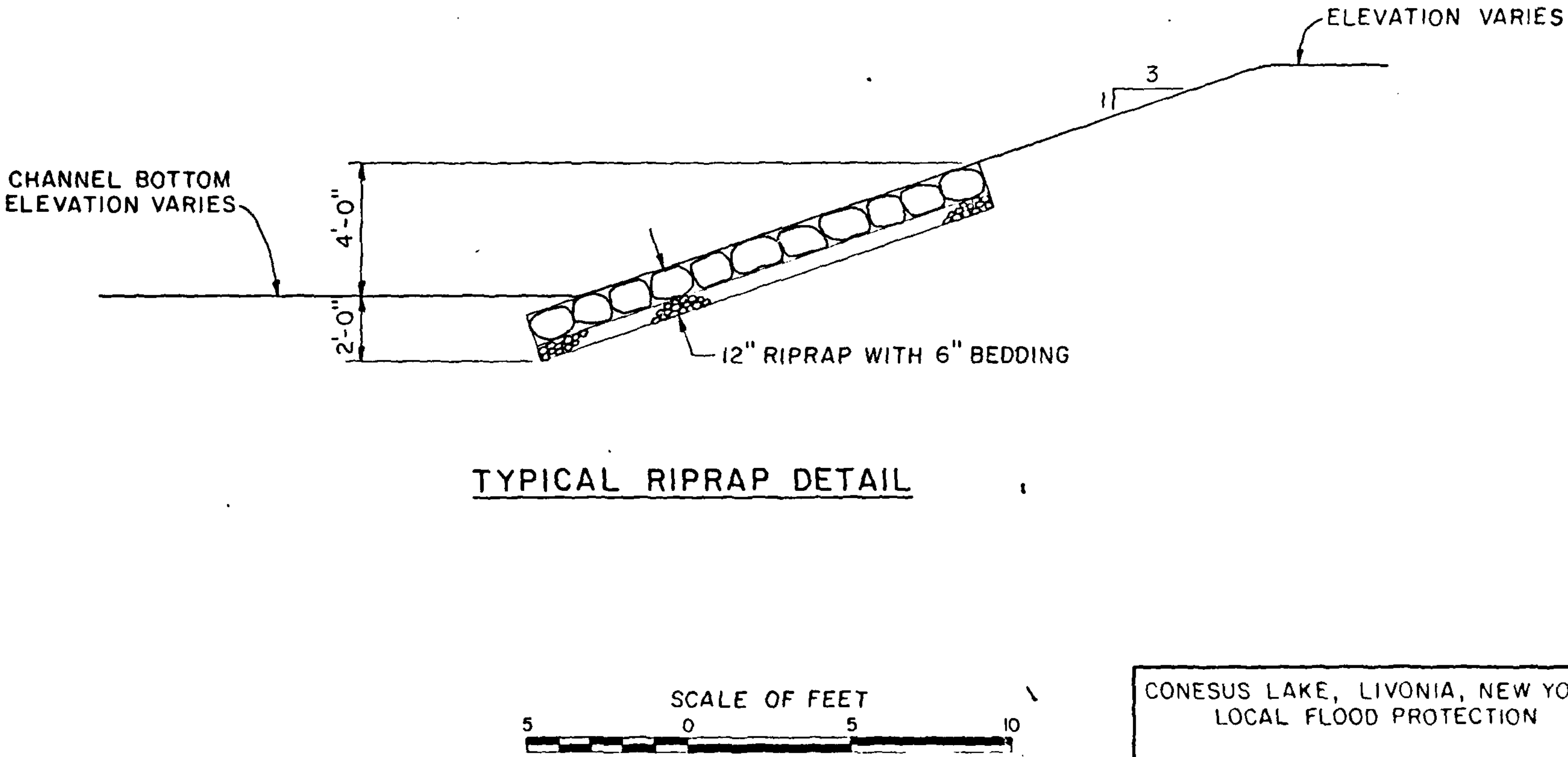
Boring No. FS 80-3 #1

Date 3/2/81

GRADATION CURVES

ENG FORM 1 MAY 63 2087

FIGURE C8

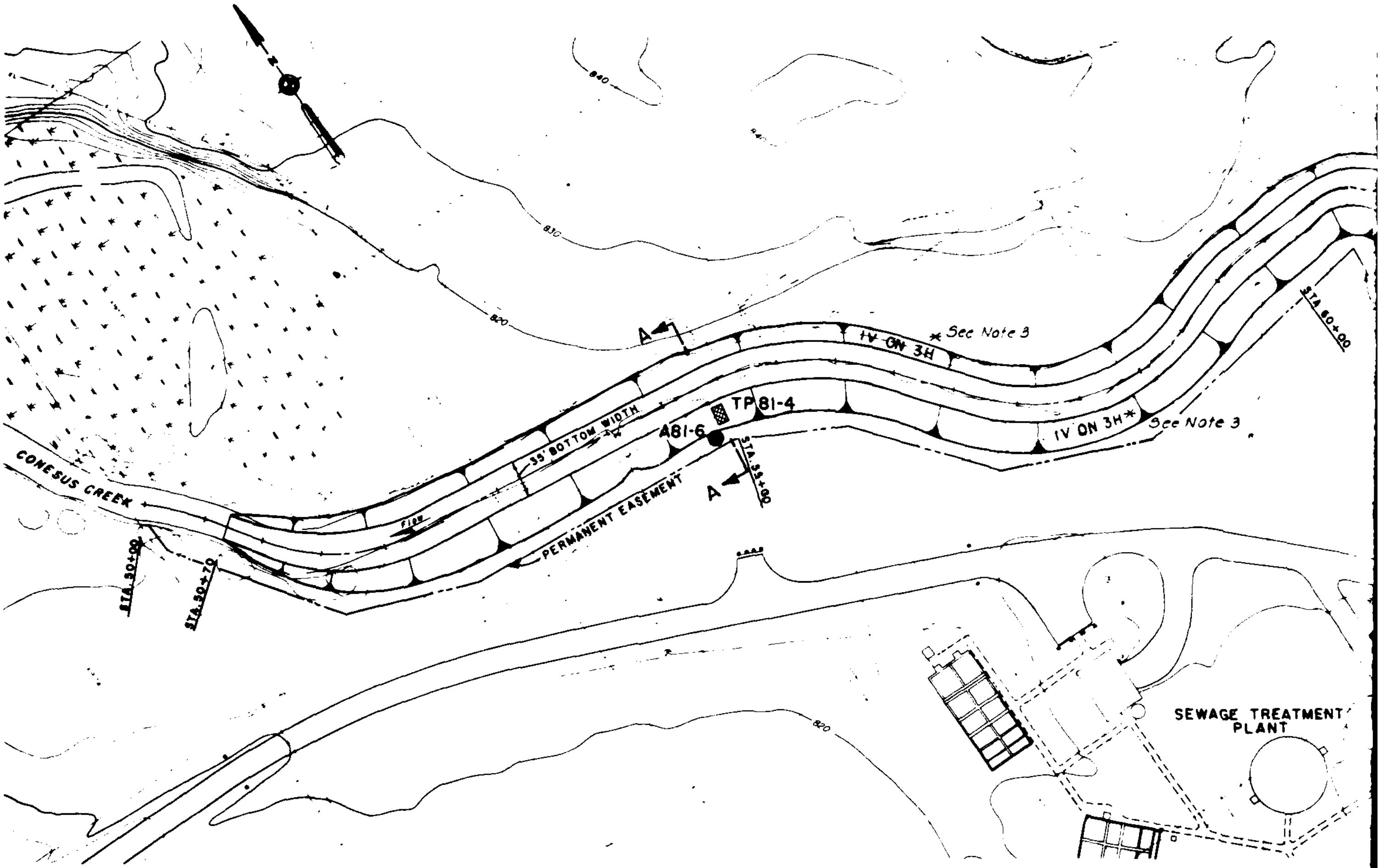


TYPICAL RIPRAP DETAIL

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

RIPRAP TOE PROTECTION

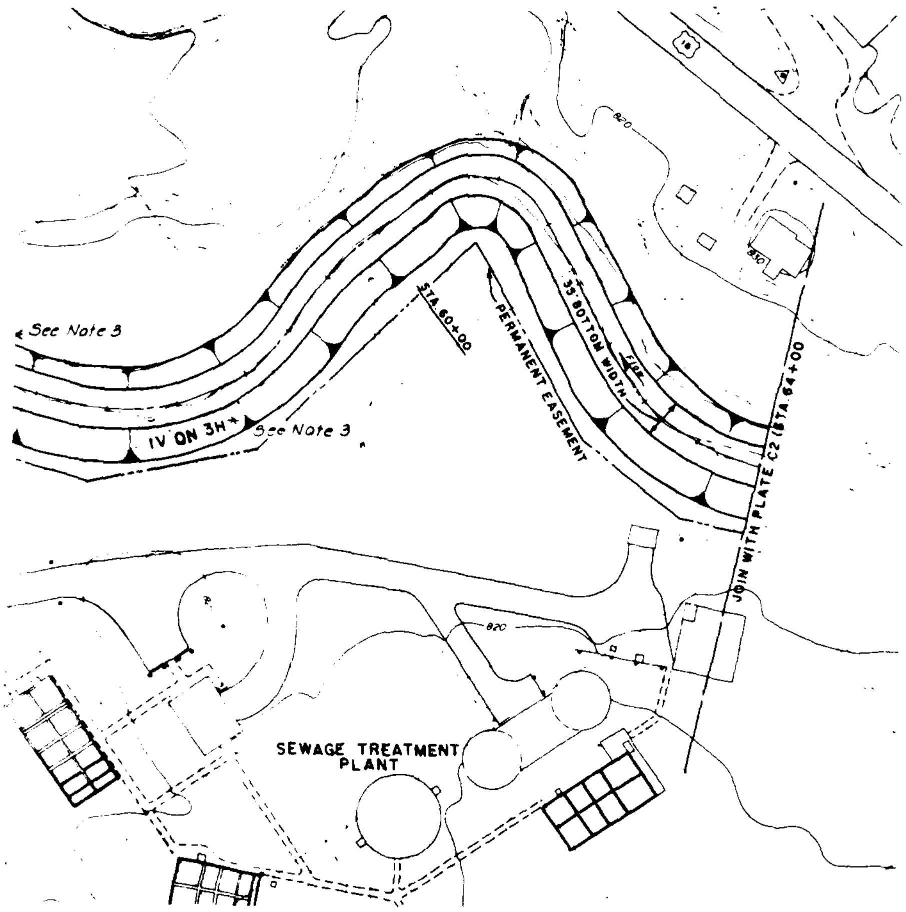
SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT BUFFALO
31



PLAN

SCALE OF FEET

50 0 50 100



LEGEND

● AB1-6 PHASE I BORING (COMPLETED)

▩ TP81-4 TEST PIT LOCATION (COMPLETED)

NOTES:

1. For Geologic Cross Section A-A (Sta 55+00), see Plate C4.C.
2. For Geologic Profile (Sta 50+00 to Sta 64+00), see Plate C-4.B.

*3. Current design calls for excavation on West Bank only from Sta. 50+70 to Sta. 105+00 with side slopes of 1V on 3H. However a slope stability analysis indicates that a 1V on 2.5H side slope is safe against failure. Therefore a 1V on 2.5H side slope will be considered in the final design prior to P and S.

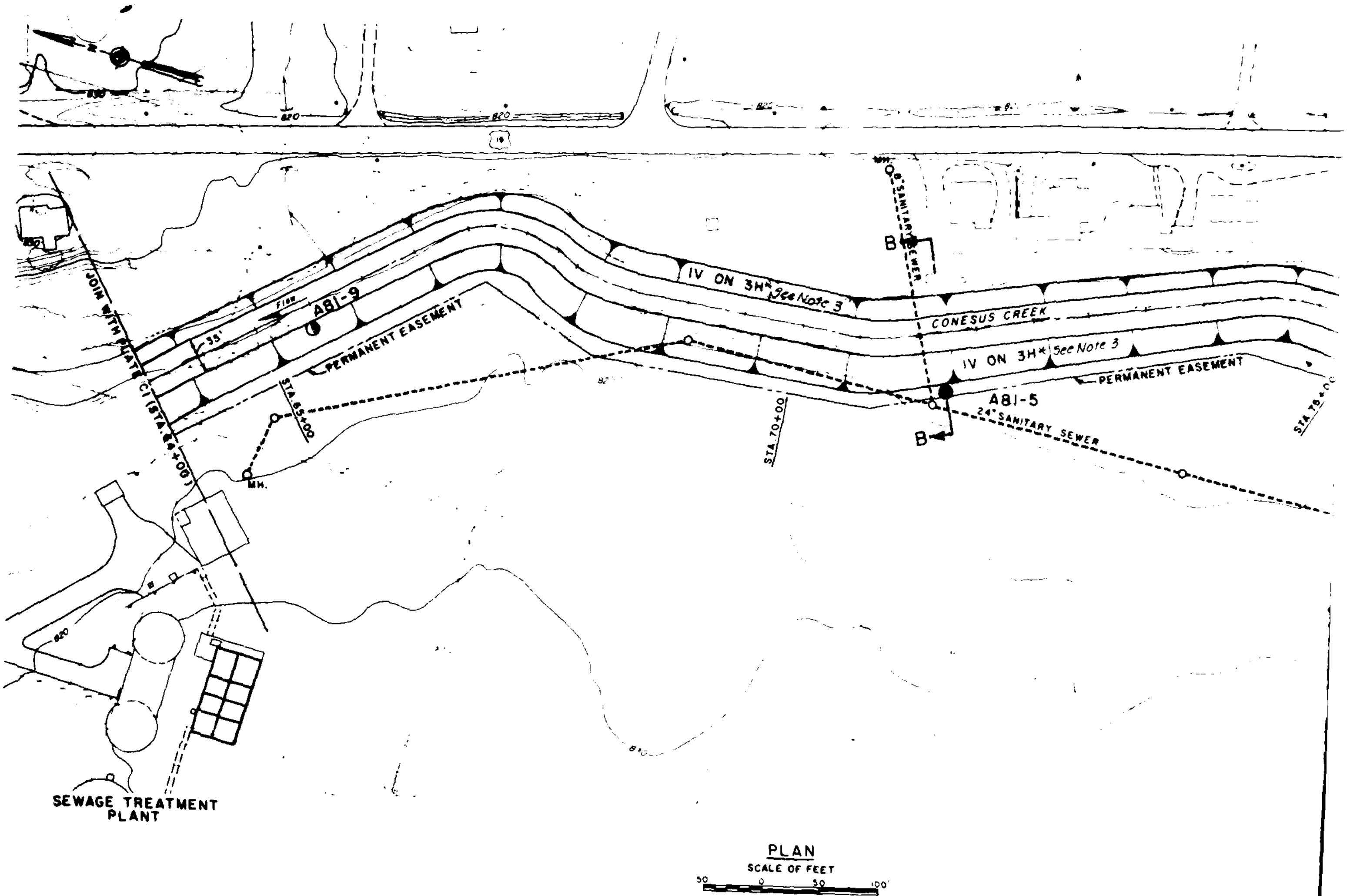
CONESUS LAKE
LIVONIA, NEW YORK

LOCAL FLOOD PROTECTION
SECTION 205

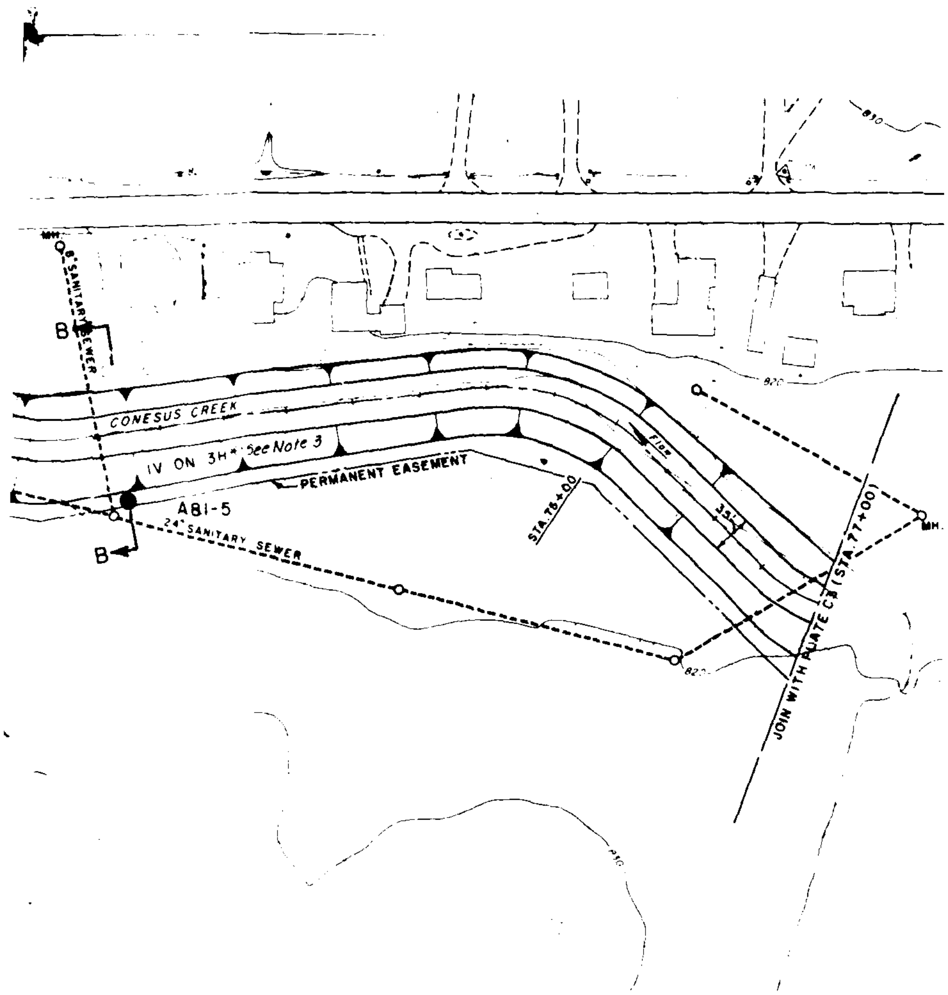
LOCATION MAP FOR
SUBSURFACE EXPLORATIONS

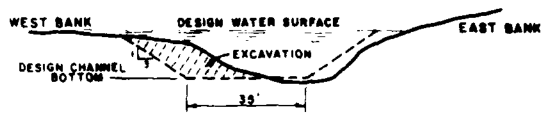
U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE C1



IV ON 3H* See Note 3
CONESUS CREEK
IV ON 3H* See Note 3
PERMANENT EASEMENT
PERMANENT EASEMENT
A81-9
A81-5
24" SANITARY SEWER
SANITARY SEWER
STA 65+00
STA 70+00
JOIN WITH PLATE C1 (STA 64+00)
MH.
SEWAGE TREATMENT PLANT
PLAN
SCALE OF FEET
50 0 50 100





TYPICAL CHANNEL SECTION
STA 52+00 TO 20A
(NOT TO SCALE)

LEGEND

- ● A81-5 PHASE I BORING (COMPLETED)
- ◑ A81-9 PHASE II BORING (TO BE PERFORMED PRIOR TO P AND S)

NOTES:

1. For Geologic Cross Section B-B (Sta 71+20), see Plate C4.C
2. For Geologic Profile (Sta 64+00 to Sta 77+00), see Plate C4.B

* 3. Current design calls for excavation on West Bank only from Sta 50+70 to Sta 105+00 with side slopes 1V on 3H. However a slope stability analysis indicates that a 1V on 2.5H side slope is safe against failure. Therefore a 1V on 2.5H side slope will be considered in the final design prior to P and S.

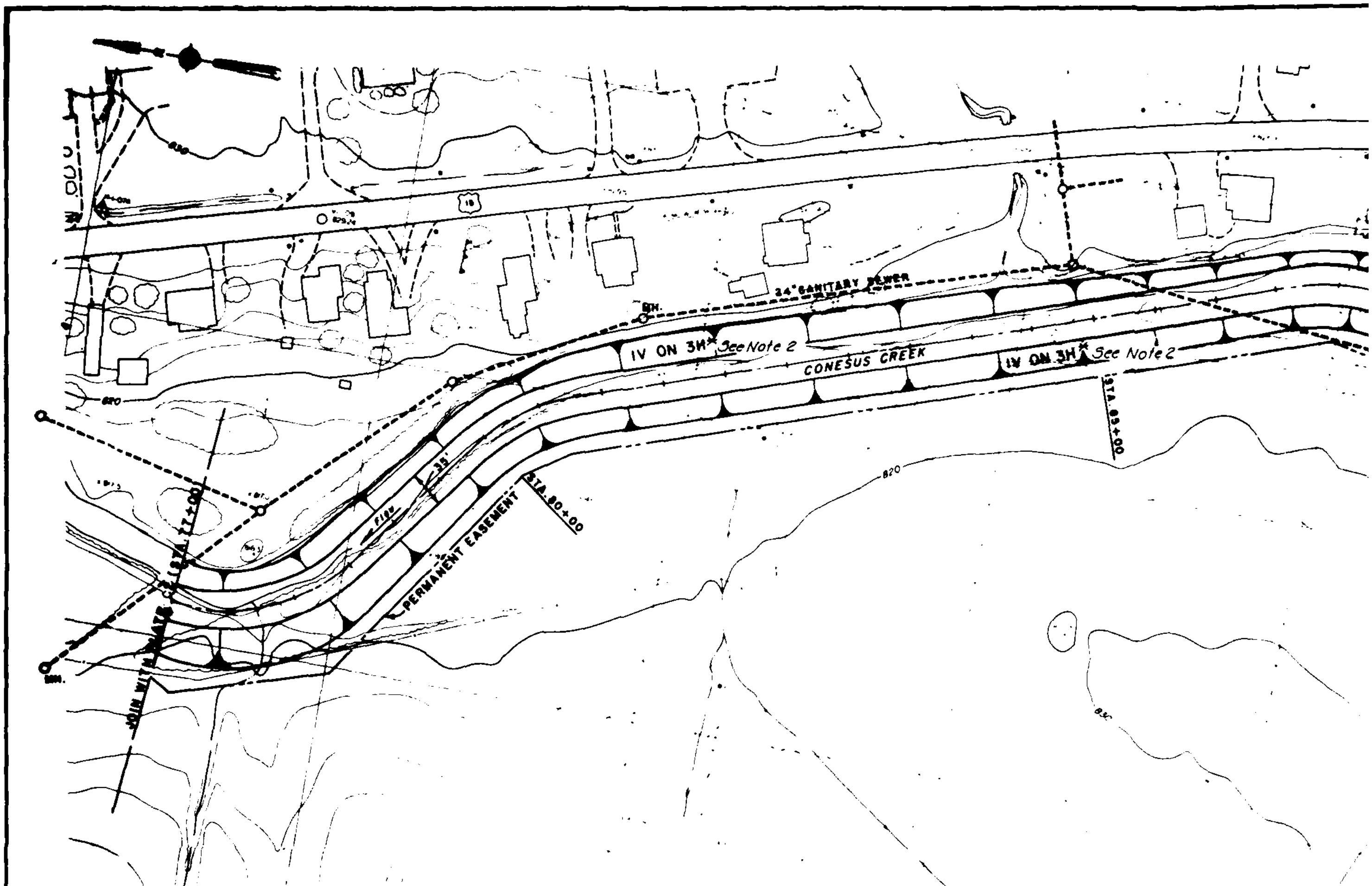
CONESUS LAKE
LIVONIA, NEW YORK

LOCAL FLOOD PROTECTION
SECTION 205

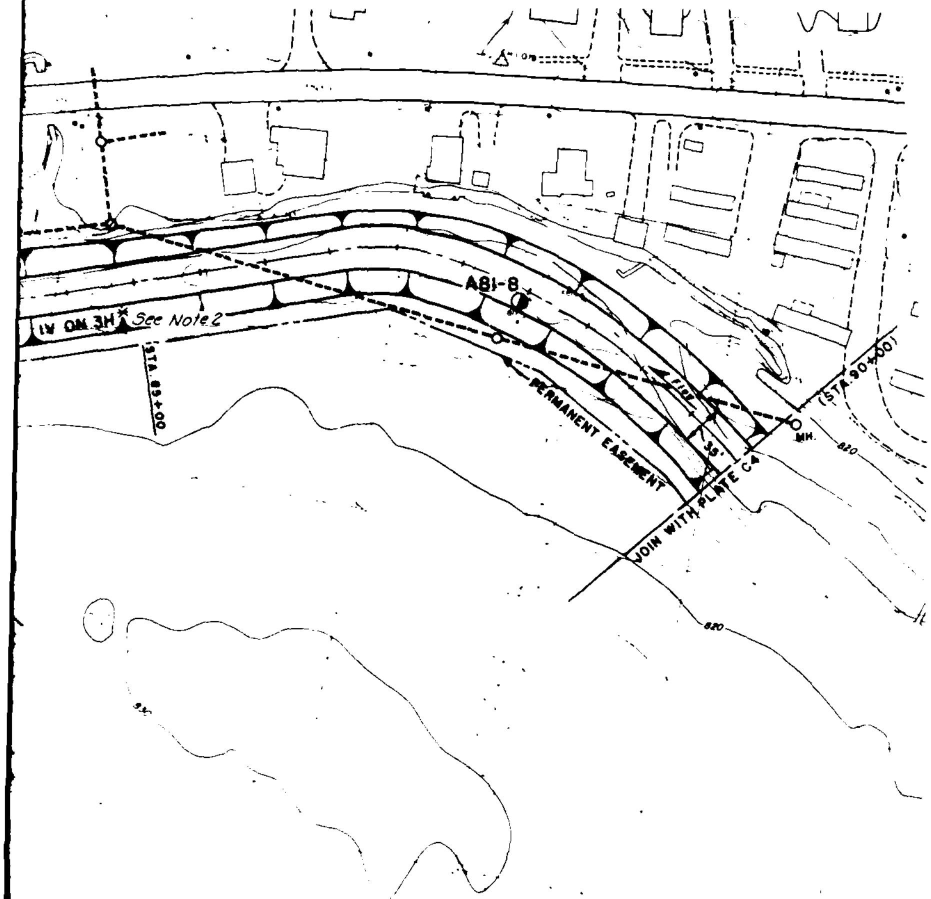
LOCATION MAP FOR
SUBSURFACE EXPLORATIONS

U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE C2



PLAN
SCALE OF FEET
50 0 50 100



LEGEND

◐ A81-8 PHASE II BORING (TO BE PERFORMED PRIOR TO P AND S)

NOTES:

1 For Geologic Profile (Sta 77+00 to Sta 90+00), see Plate C-4.B.

*2 Current design calls for excavation on West Bank only from Sta. 50+70 to Sta. 105+00 with side slopes 1V on 3H. However a slope stability analysis indicates that a 1V on 2.5H side slope is safe against failure. Therefore a 1V on 2.5H side slope will be considered in the final design prior to P and S.

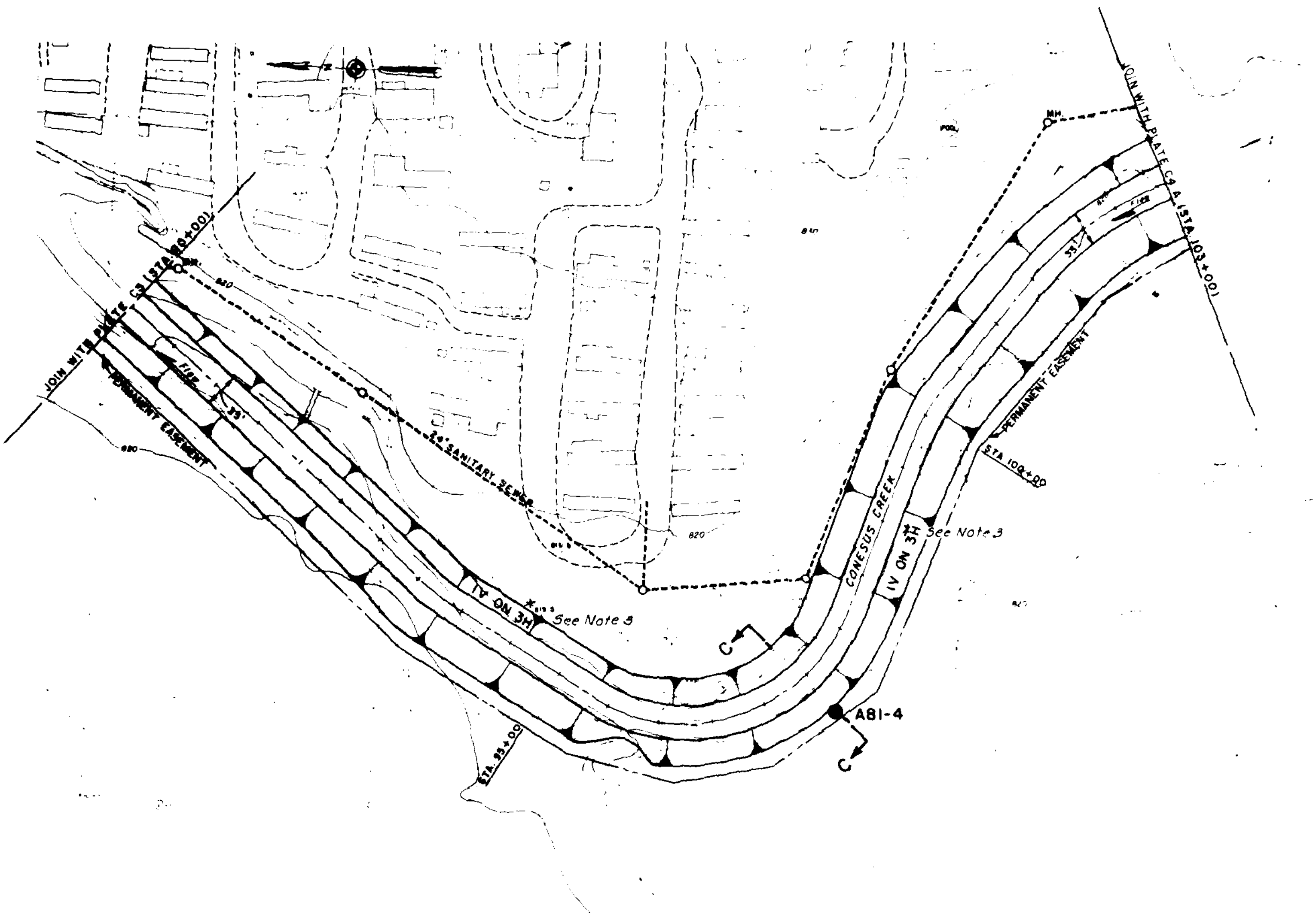
CONESUS LAKE
LIVONIA, NEW YORK

LOCAL FLOOD PROTECTION
SECTION 205

LOCATION MAP FOR
SUBSURFACE EXPLORATIONS

U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

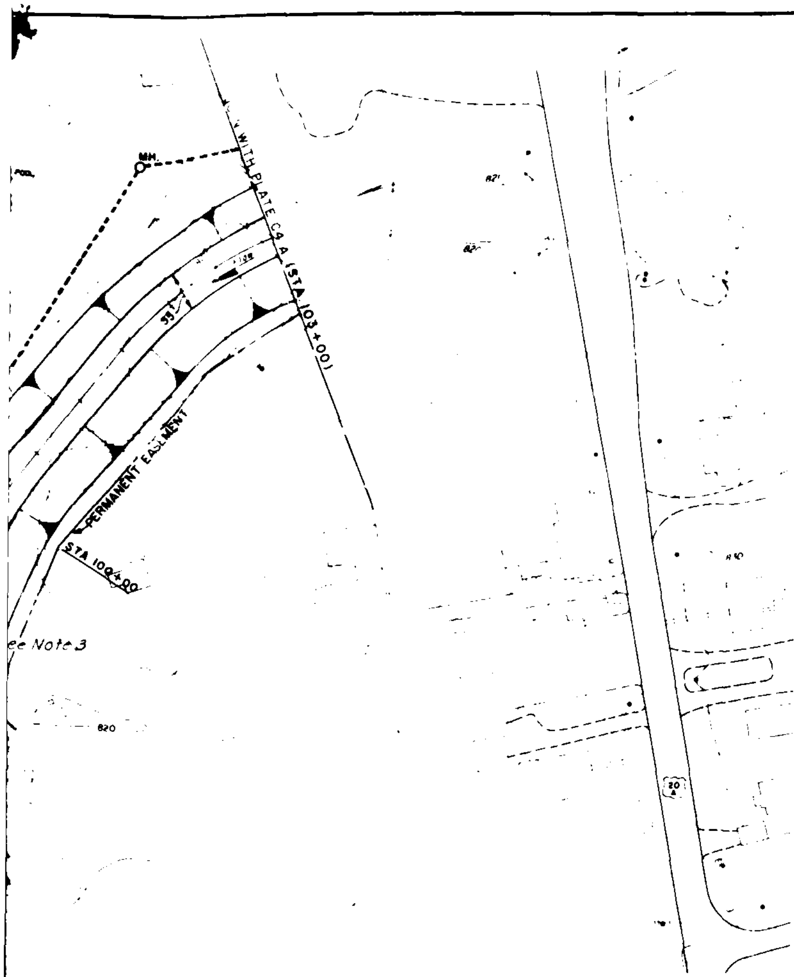
PLATE C3



PLAN

SCALE OF FEET

50 0 50' 100



LEGEND

● AB1-4 PHASE I BORING (COMPLETED)

NOTES:

1 For Geologic Cross Section C-C (Sta 97+48), see Plate C4.C

2 For Geologic Profile (Sta 90+00 to Sta 103+00), see Plate C4.B

*3 Current design calls for excavation on West Bank only from Sta 50+70 to Sta. 105+00 with side slopes 1V on 3H. However a slope stability analysis indicates that a 1V on 2.5H sideslope is safe against failure. Therefore a 1V on 2.5H sideslope will be considered in the final design prior to P and S.

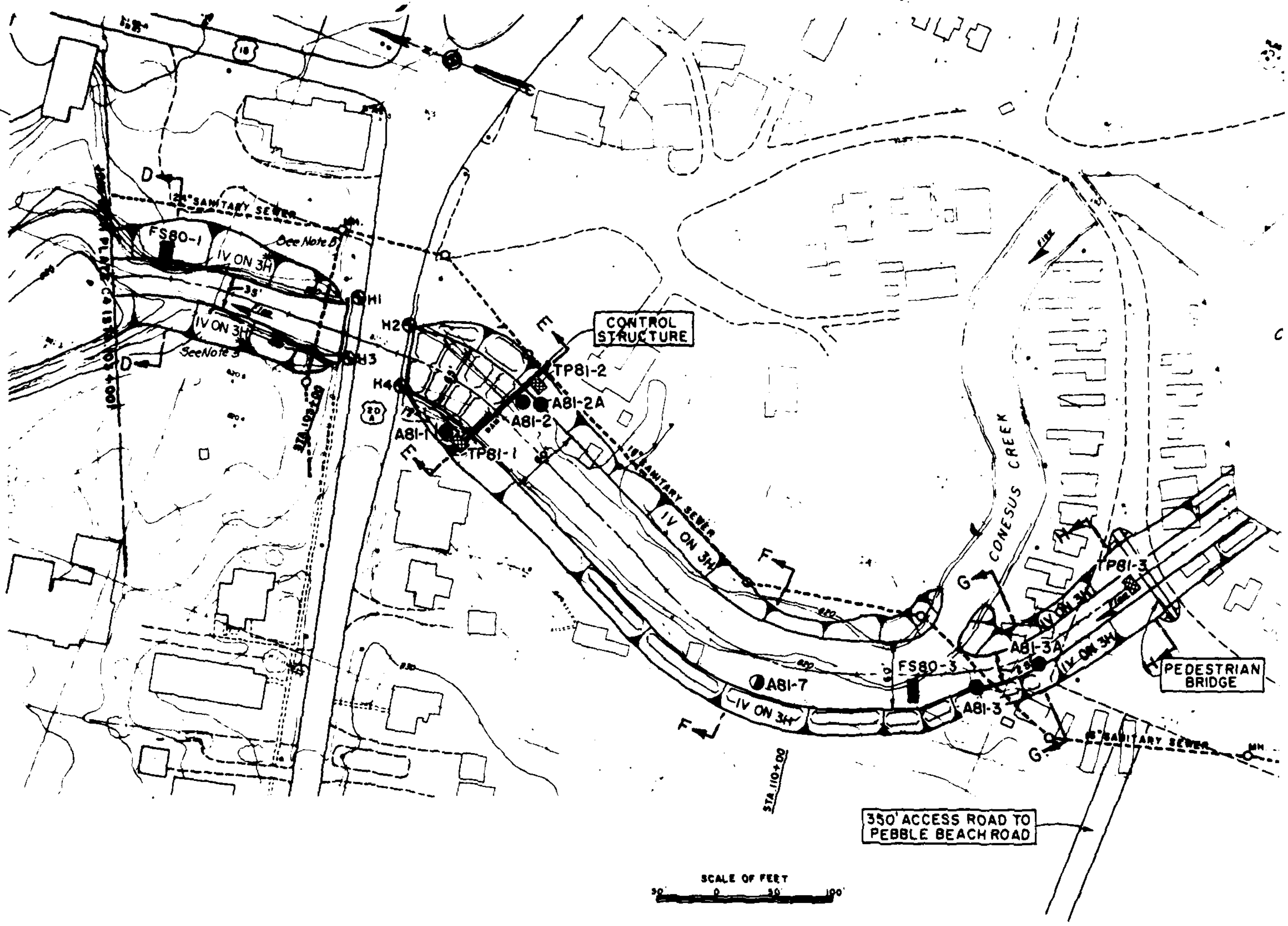
CONESUS LAKE
LIVONIA, NEW YORK

LOCAL FLOOD PROTECTION
SECTION 205

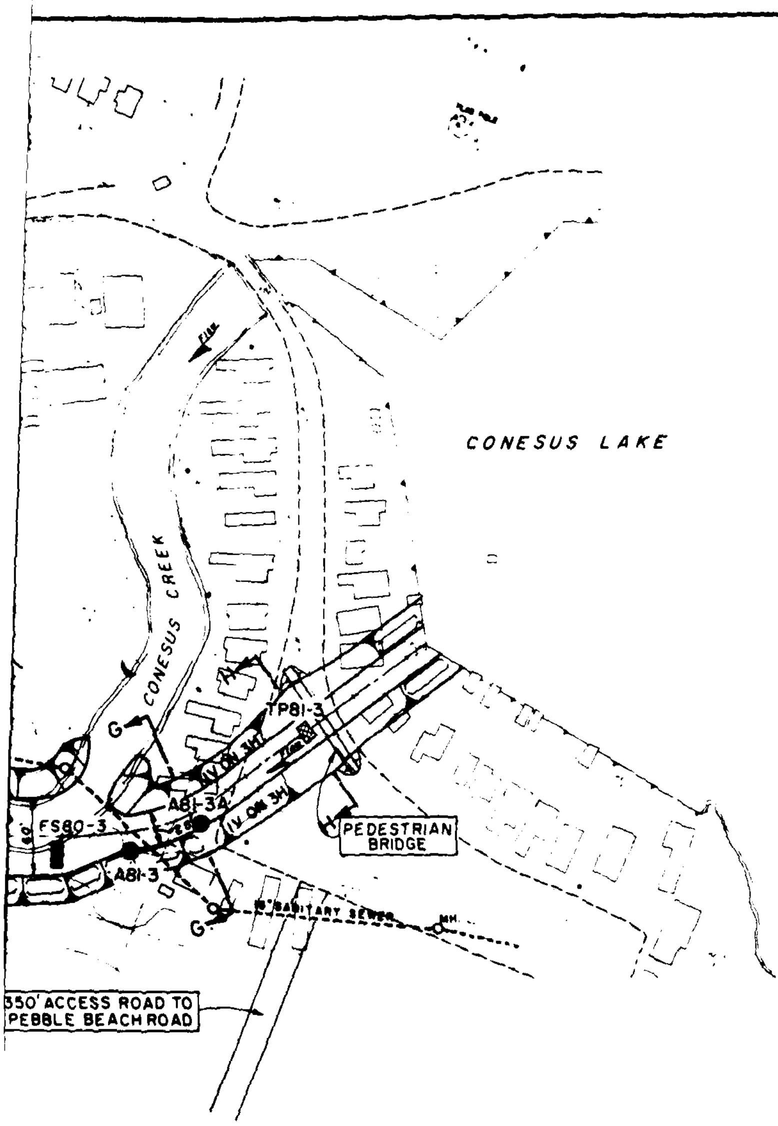
LOCATION MAP FOR
SUBSURFACE EXPLORATIONS

U S ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE C4



CONTROL STRUCTURE
PEDESTRIAN BRIDGE
350' ACCESS ROAD TO PEBBLE BEACH ROAD
CONESUS CREEK
12" SANITARY SEWER
8" SANITARY SEWER
1V ON 3H
FS80-1
FS80-3
A81-1
A81-2
A81-2A
A81-3
A81-3A
A81-7
TP81-1
TP81-2
TP81-3
H1
H2
H3
H4
See Note 3
SCALE OF FEET



LEGEND

	GEOLOGIC SECTION
FS80-	FIELD STRIP LOCATION (COMPLETED)
H1	BORINGS BY N.Y.S. D.O.T.
	RIPRAP PROTECTION
A81-3	PHASE I AUGER BORINGS (COMPLETED)
A81-7	PHASE II AUGER BORINGS (TO BE PERFORMED PRIOR TO P AND S).
TP81-1	TEST PIT LOCATION (COMPLETED)

NOTES:

1. FOR GEOLOGIC SECTION D-D (STA. 103+50) SEE PLATE C4.D E-E (STA. 106+40) SEE PLATE C4.E, F-F (STA. 109+50) AND G-G (STA. 112+00) SEE PLATE C4.D, AND FOR H-H (STA. 113+00), SEE PLATE C4.E
2. FOR GEOLOGIC PROFILE (STA. 103+00 TO STA. 115+00), SEE PLATE C4.B.
3. * CURRENT DESIGN CALLS FOR EXCAVATION ON WEST BANK ONLY FROM STA. 50+70 TO STA. 105+00 WITH SIDESLOPES 1V ON 3H. HOWEVER A SLOPE STABILITY ANALYSIS INDICATES THAT A 1V ON 2.5H SIDESLOPE IS SAFE AGAINST FAILURE. THEREFORE A 1V ON 2.5H SIDESLOPE WILL BE CONSIDERED IN THE FINAL DESIGN PRIOR TO P AND S.

CONESUS LAKE
LIVONIA, NEW YORK

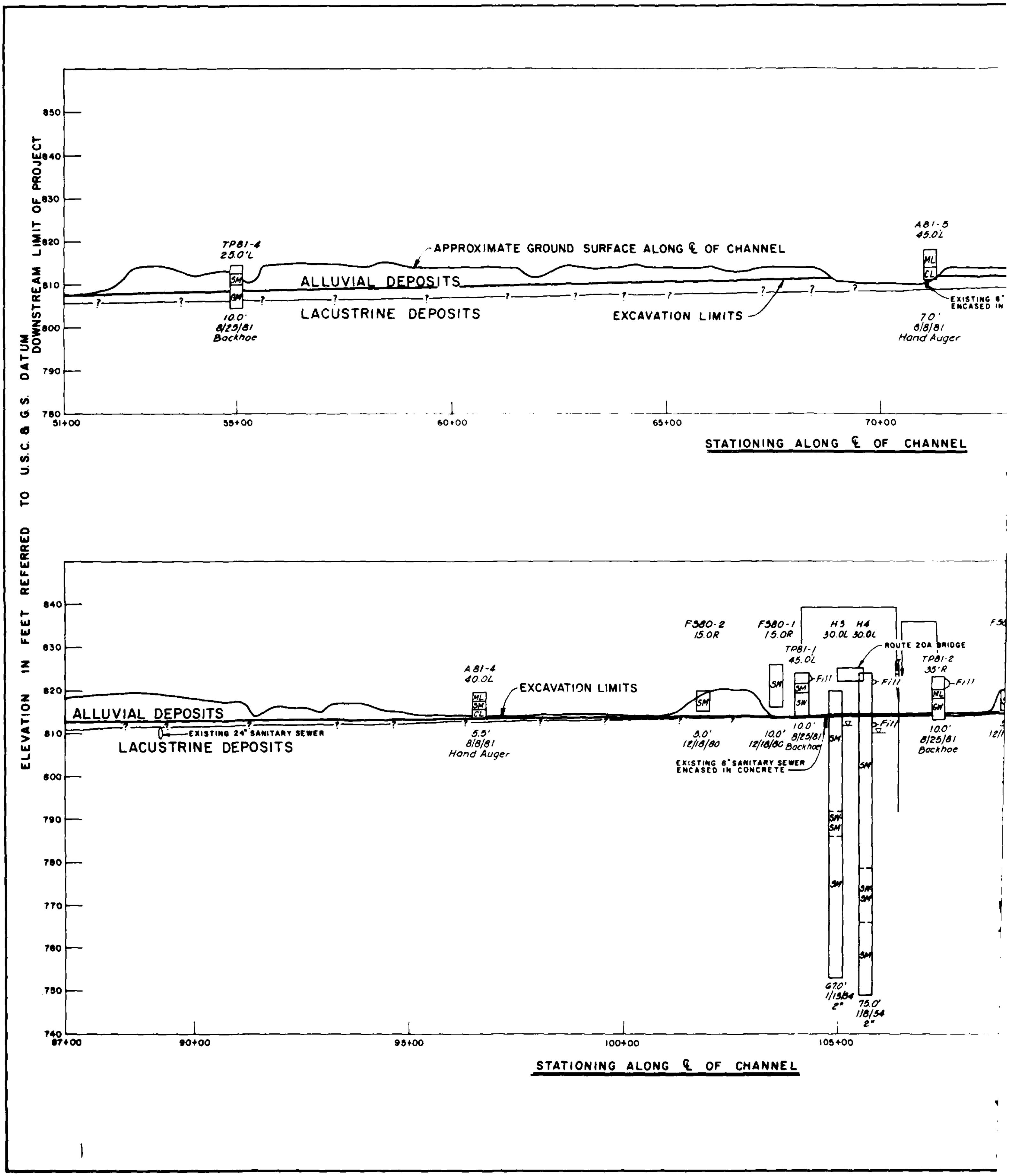
LOCAL FLOOD PROTECTION
SECTION 205

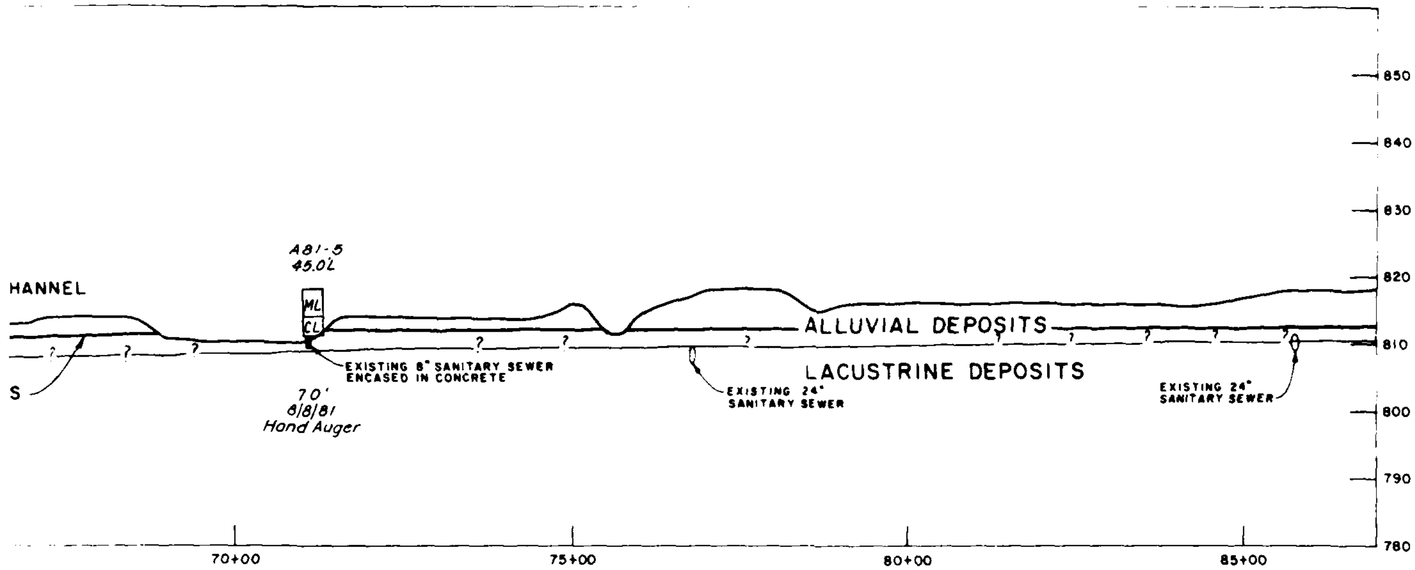
LOCATION MAP FOR
SUBSURFACE EXPLORATIONS

2

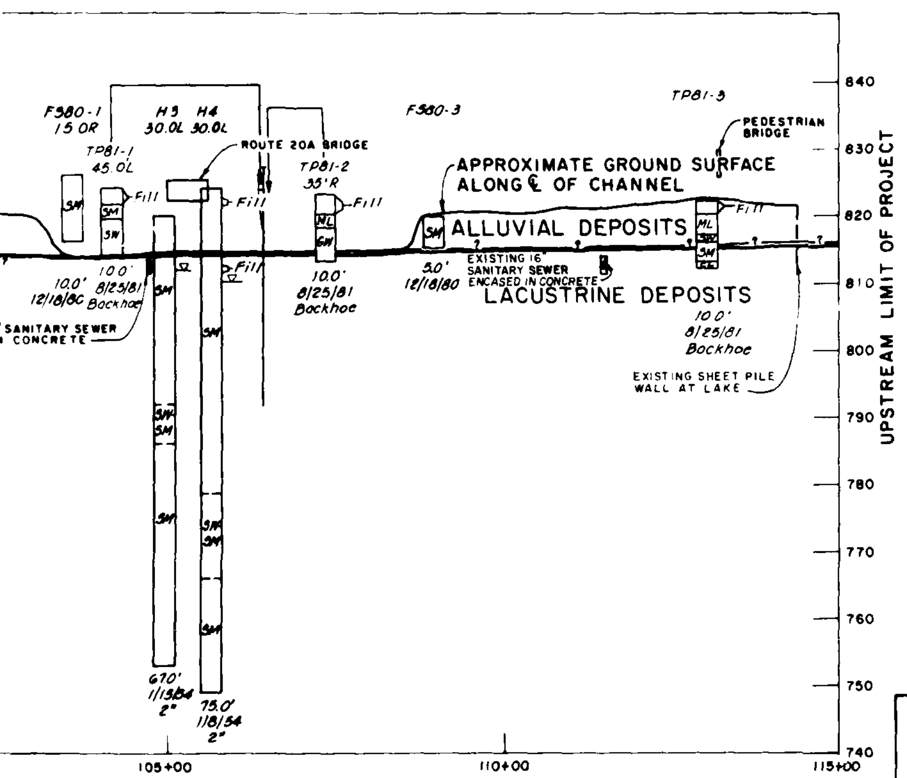
U.S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE C4.A


ELEVATION IN FEET REFERRED TO U.S.C. & G.S. DATUM
DOWNSTREAM LIMIT OF PROJECT
APPROXIMATE GROUND SURFACE ALONG ℄ OF CHANNEL
ALLUVIAL DEPOSITS
LACUSTRINE DEPOSITS
EXCAVATION LIMITS
TP81-4
25.0'L
10.0'
8/25/81
Backhoe
A81-5
45.0'L
7.0'
8/8/81
Hand Auger
EXISTING 8"
ENCASED IN
850
840
830
820
810
800
790
780
51+00
55+00
60+00
65+00
70+00
STATIONING ALONG ℄ OF CHANNEL
ALLUVIAL DEPOSITS
LACUSTRINE DEPOSITS
EXISTING 24" SANITARY SEWER
EXCAVATION LIMITS
A81-4
40.0'L
5.5'
8/8/81
Hand Auger
F380-2
15.0R
5.0'
12/18/80
F380-1
15.0R
10.0'
12/18/80
TP81-1
45.0'L
10.0'
8/25/81
Backhoe
H3
30.0L
H4
30.0L
ROUTE 20A BRIDGE
TP81-2
35'R
10.0'
8/25/81
Backhoe
Fill
EXISTING 8" SANITARY SEWER
ENCASED IN CONCRETE
67.0'
1/13/54
2"
75.0'
1/8/54
2"
840
830
820
810
800
790
780
770
760
750
740
87+00
90+00
95+00
100+00
105+00
STATIONING ALONG ℄ OF CHANNEL



TIONING ALONG ℄ OF CHANNEL



CHANNEL

NOTES:

1. F580-1, A81-5, and TP81-1 represent a field strip, hand auger and test pit taken by Buffalo District.
2. H3 and H4 were drilled, logged and tested by New York State Department of Transportation for design of Route 20A Bridge in 1954.
3. For the Legend of the Unified Soil Classification, see Plate C4.C.
4. Contact for Alluvial and Lacustrine Deposits is inferred.
5. For Geologic Sections, see Plates C4.C, C4.D and C4.E.

LEGEND OF EXPLORATION

Boring or field strip number	F580-1, H3
Offset (L,R)*	10.0L
Laboratory classification	SM
Observed water level	▽
Depth of sampling	7.0'
Date completed	1-8-54
Sample size	2"

*Left or right of centerline, looking downstream

CONESUS LAKE
LIVONIA, NEW YORK

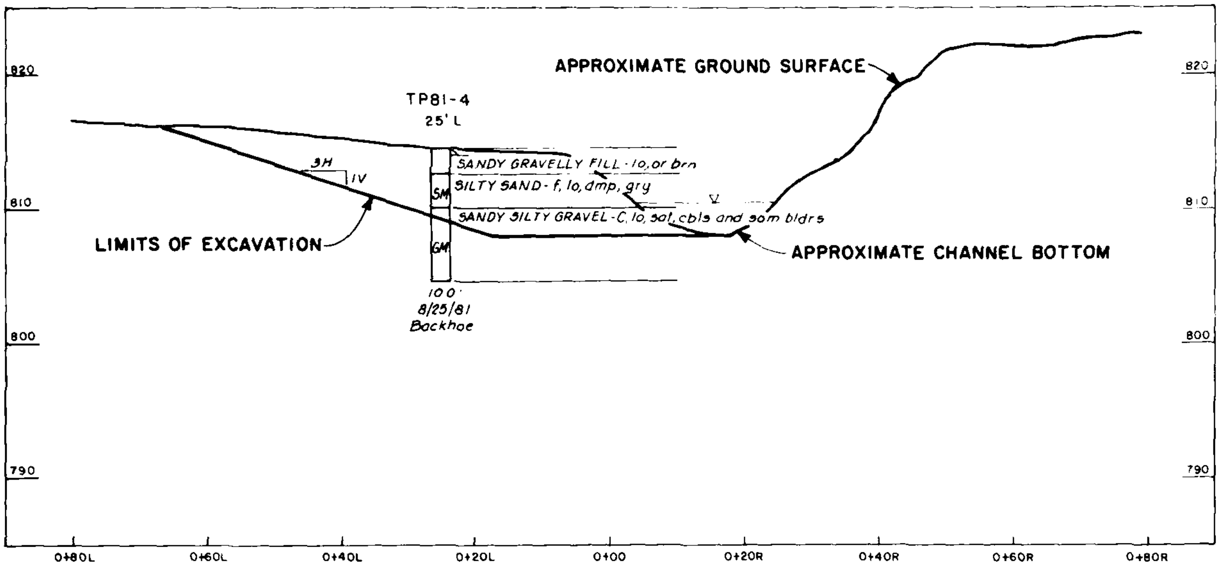
LOCAL FLOOD PROTECTION
SECTION 205

GEOLOGIC PROFILE

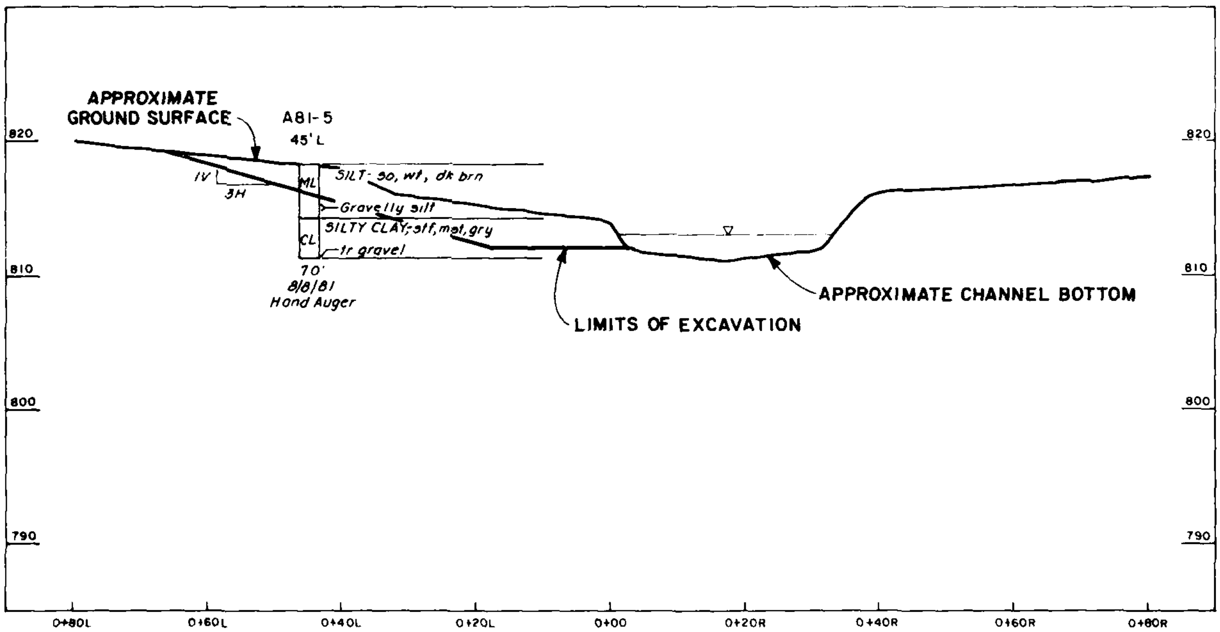
STATION 51+00 TO 115+00

U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

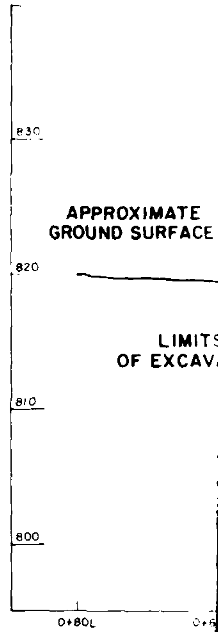
PLATE C4.B



GEOLOGIC SECTION A-A STATION 55+00



GEOLOGIC SECTION B-B STATION 71+20



LEGEND (UN

GW Well graded gr mixtures, little o

GP Poorly graded sand mixtures.

GM Silty gravels mixtures

GC Clayey gravels mixtures

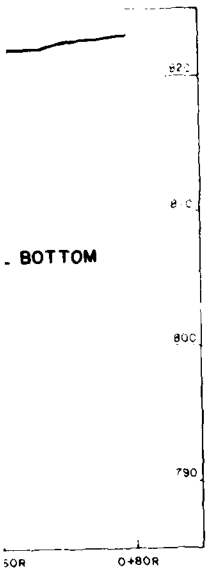
SW Well-graded little or no fine

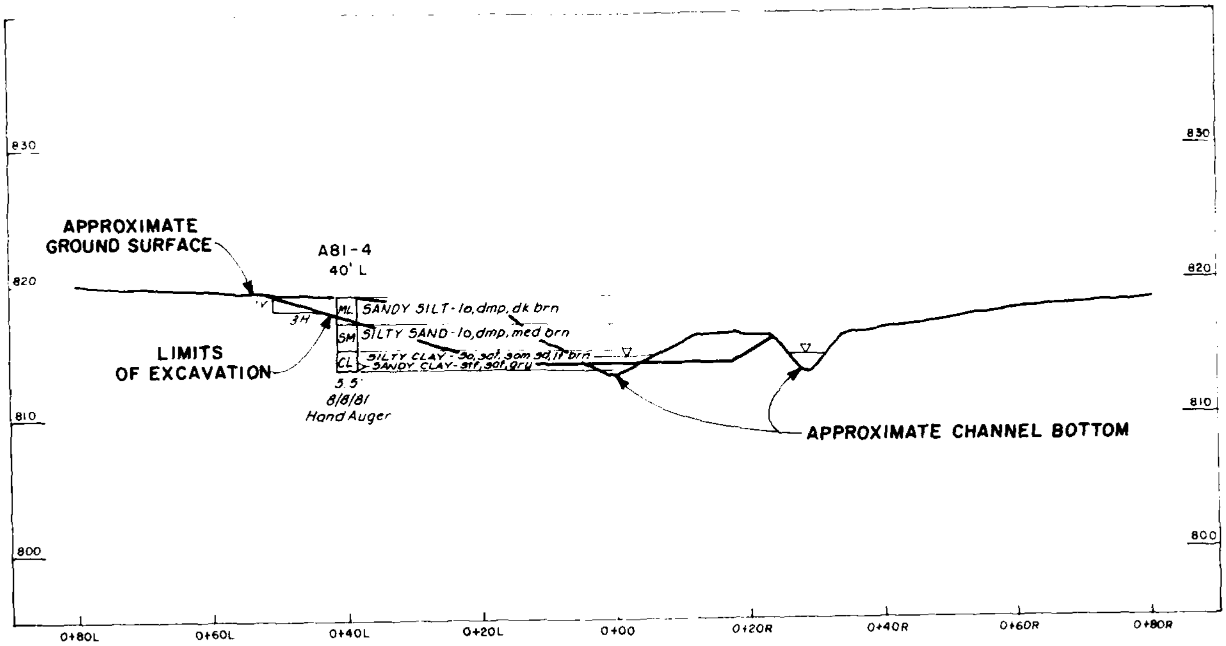
SP Poorly graded sands, little o

SM Silty sands sa

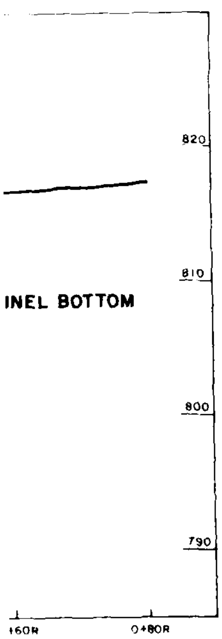
SC Clayey sands

Classification fr
Dual classificat
Classification
For details on the
Technical Memor





GEOLOGIC SECTION C-C STATION 97+48



NOTES:

1. For location of Section A-A (Sta 55+00), see Plate C1.
2. For location of Section B-B (Sta 71+20), see Plate C2.
3. For location of Section C-C (Sta 97+48), see Plate C4.
4. For legend of explorations, see Plate C4.E.
5. For list of abbreviations, see Plate C4.E.

LEGEND (UNIFIED SOIL CLASSIFICATION SYSTEM)

- GW Well graded gravels, gravel-sand mixtures, little or no fines.
- GP Poorly graded gravels or gravel-sand mixtures, little or no fines
- GM Silty gravels, gravel-sand-silt mixtures.
- GC Clayey gravels, gravel-sand-clay mixtures
- SW Well-graded sands, gravelly sands, little or no fines.
- SP Poorly graded sands or gravelly sands, little or no fines
- SM Silty sands sand-silt mixtures
- SC Clayey sands, sand-clay mixtures
- ML Inorganic silts and very fine sands rock flour, silty or clayey fine sands or clayey silts w/slight plasticity.
- CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
- OL Organic silts and organic silty clays of low plasticity
- MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
- CH Inorganic clays of high plasticity, fat clays
- OH Organic clays of medium to high plasticity, organic silts
- Pt Peat and other highly organic soils

Classification from actual laboratory tests where LL and PL are shown.
Dual classification, where used is in accordance with the Unified Soil Classification System.
For details on the Unified Soil Classification System, see Waterways Experiment Sta Technical Memorandum No. 3-357 dated March 1953 and revised in 1960.

CONESUS LAKE
LIVONIA, NEW YORK

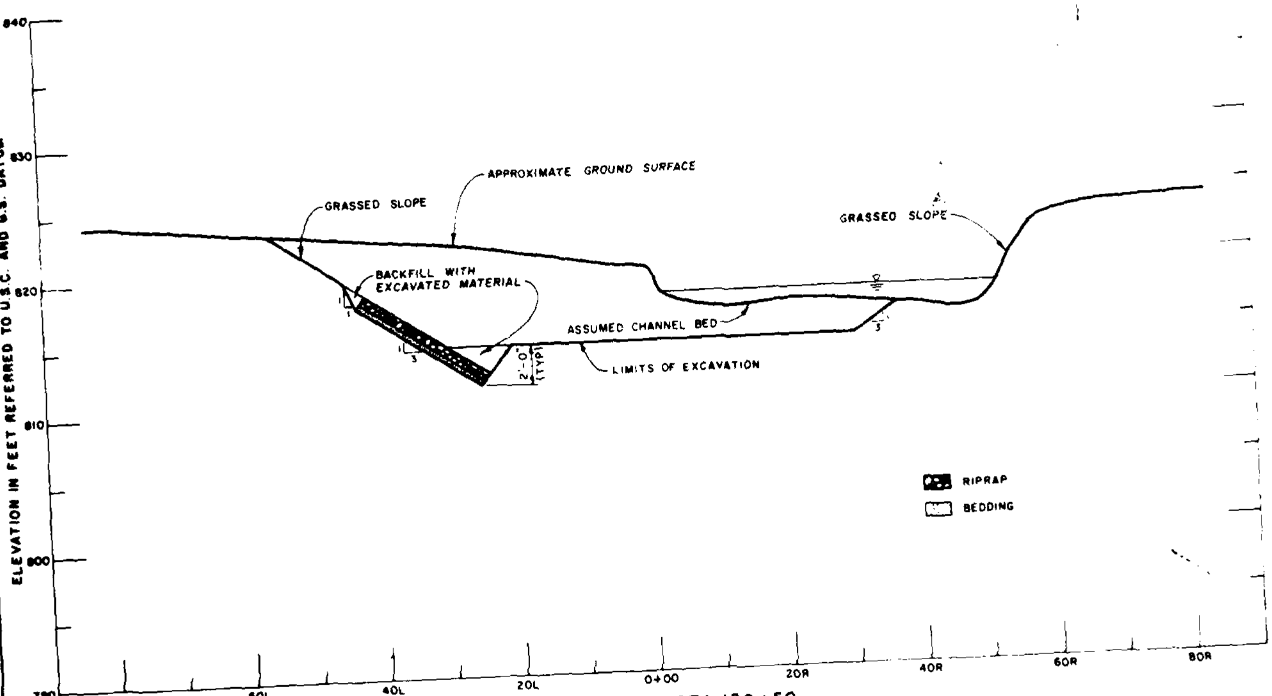
LOCAL FLOOD PROTECTION
SECTION 205

GEOLOGIC SECTIONS

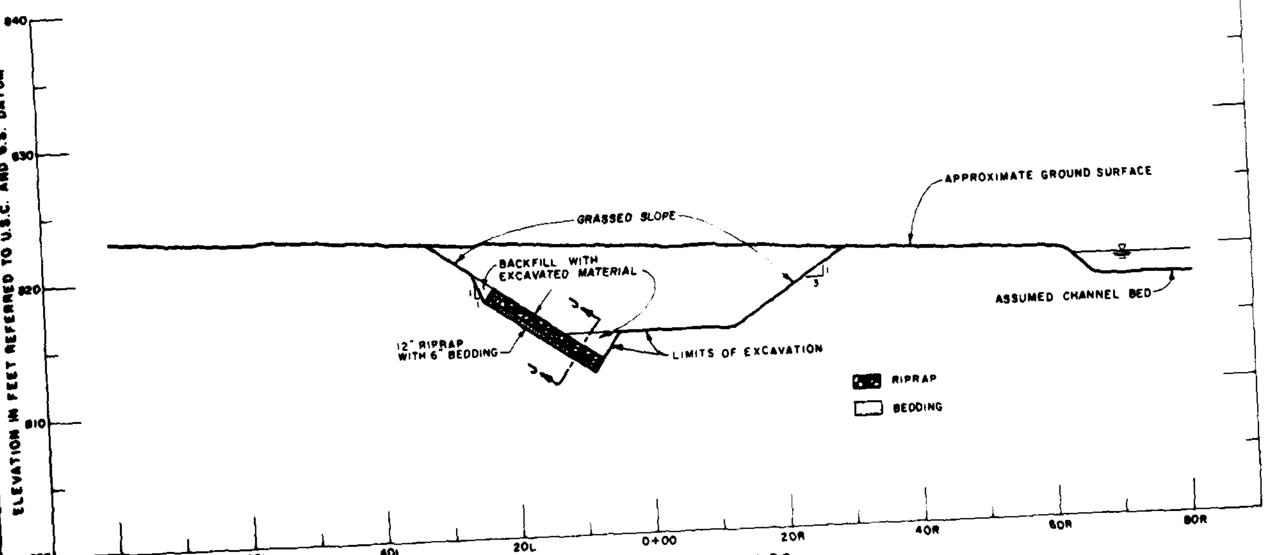
STA. 55+00, STA. 71+20 AND STA. 97+48

U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

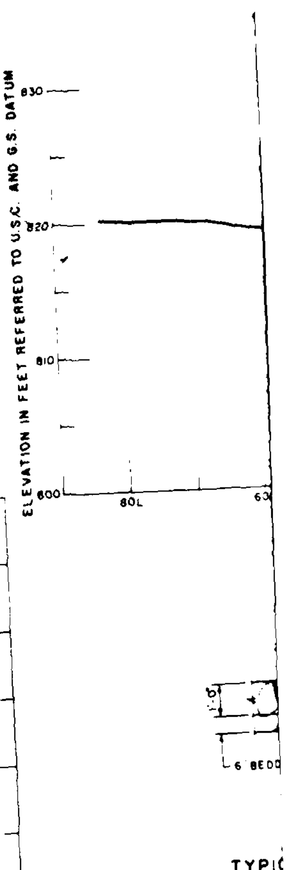
PLATE C4.C

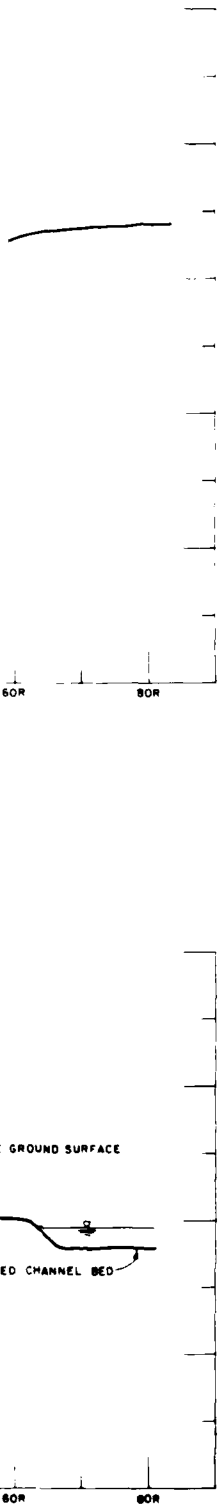


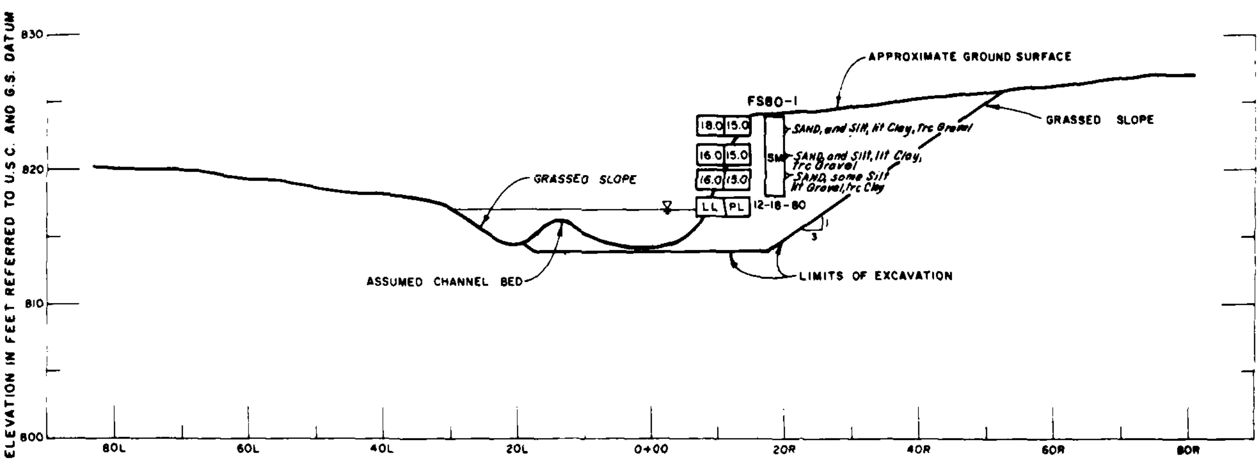
SECTION F-F STA. 109+50



SECTION G-G STA. 112+00



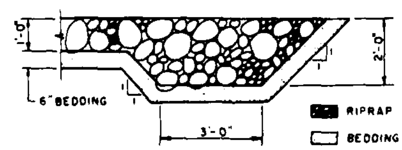




SECTION D-D STA. 103+50

NOTES:

1. FOR MAP LOCATION OF SECTION D-D (STA. 103+50), SECTION F-F (STA. 109+50) AND SECTION G-G (STA. 112+00) SEE PLATE C4 A
2. FOR SECTION E-E (STA. 106+40), H-H (STA. 113+00), SEE PLATE C4.E
3. FOR LEGEND OF EXPLORATIONS, SEE PLATE C4.E
4. FOR LIST OF ABBREVIATIONS, SEE PLATE C4.E
5. FOR LEGEND OF UNIFIED SOIL CLASSIFICATION, SEE PLATE C4.C



SECTION J-J

TYPICAL RIPRAP END PROTECTION

SCALE ½" = 1'-0"

CONESUS LAKE
LIVONIA, NEW YORK

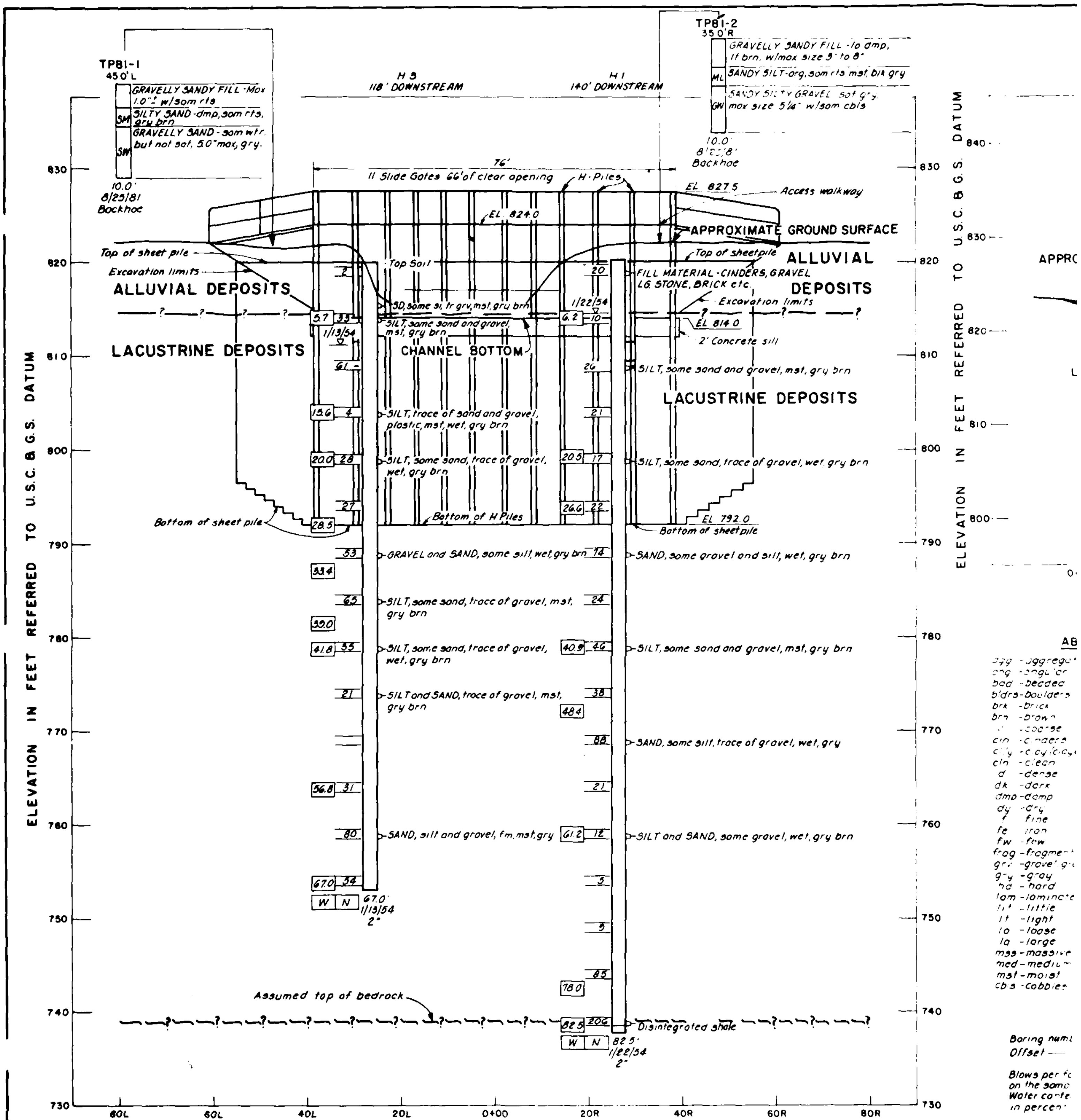
LOCAL FLOOD PROTECTION
SECTION 205

GEOLOGIC SECTIONS

STA. 109+50, STA. 112+00 AND STA. 103+50

U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

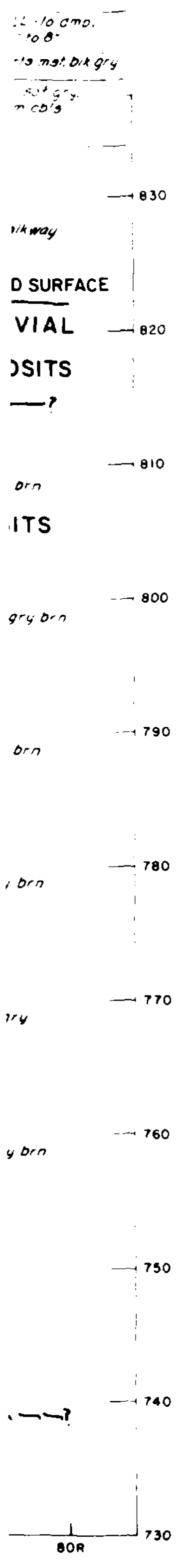
PLATE C4.D

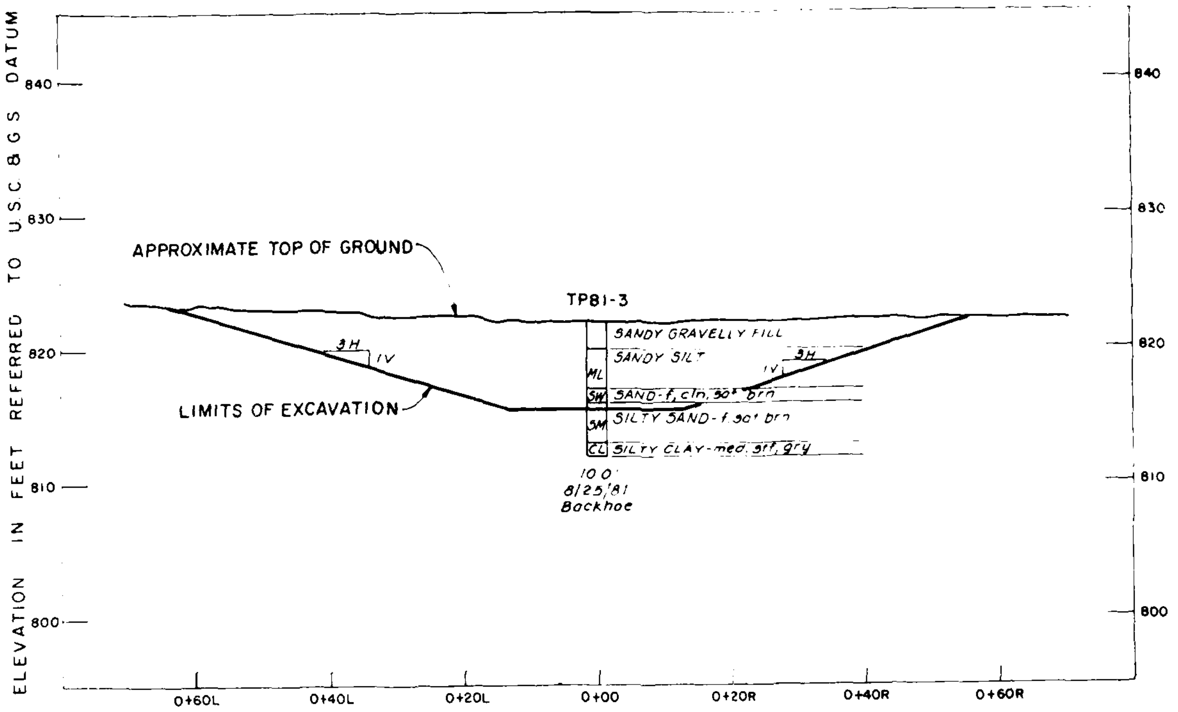


GEOLOGIC SECTION E-E

STATION 106+40

CONTROL STRUCTURE



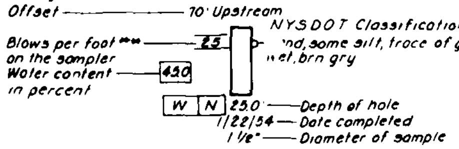


GEOLOGIC SECTION H-H
STATION 113+00

ABBREVIATIONS

agg	-aggregate	num	-numerous
ang	-angular	npl	-non plastic
bdd	-bedded	or	-orange
bldrs	-boulders	org	-organic
brk	-brick	ox	-oxide
brn	-brown	pl	-plastic
c	-coarse	poc	-pockets
cin	-cinders	rnd	-round, rounded
cl(y)	-clay (clayey)	rk	-rock
cln	-clean	rts	-roots
d	-dense	sat	-saturated
dk	-dark	sd	-sand
dmp	-damp	se	-seams
dy	-dry	si(y)	-silt, silty
f	-fine	sm	-small
fe	-iron	so	-soft
fw	-few	som	-some
frag	-fragment	stf	-stiff
grv	-gravel, gravelly	sub	-subangular
gry	-gray	szd	-sized
hd	-hard	thl	-throughout
lam	-laminated	th	-thin
lit	-little	thk	-thick
lt	-light	tr	-trace
lo	-loose	v	-very
la	-large	w/	-with
mss	-massive	wd	-wood
med	-medium	wt	-wet
mst	-moist		
cb/s	-cobbles		

LEGEND OF EXPLORATION



* SAND - Over 50 %
And - 40-50 %
Some - 10-40 %
Trace - 0-10 %

** Blows per foot using a 2" sampler, Wt of hammer - 300 LBS., Hammer fall - 18 inches.

NOTES:

1. H1 and H2 were done by the New York State Department of Transportation, Livonia, New York. Lakeville SH716, Bridge No. 2.
2. For map location of Section E-E (Sta 106+40) and Section H-H (Sta 113+00), see Plate C4.A.
3. For other geologic sections, see Plates C4.C and C4.D.
4. Details of the Control Structure appear on Plate D5.
5. For legend of Unified Soil Classification, see Plate C4.C

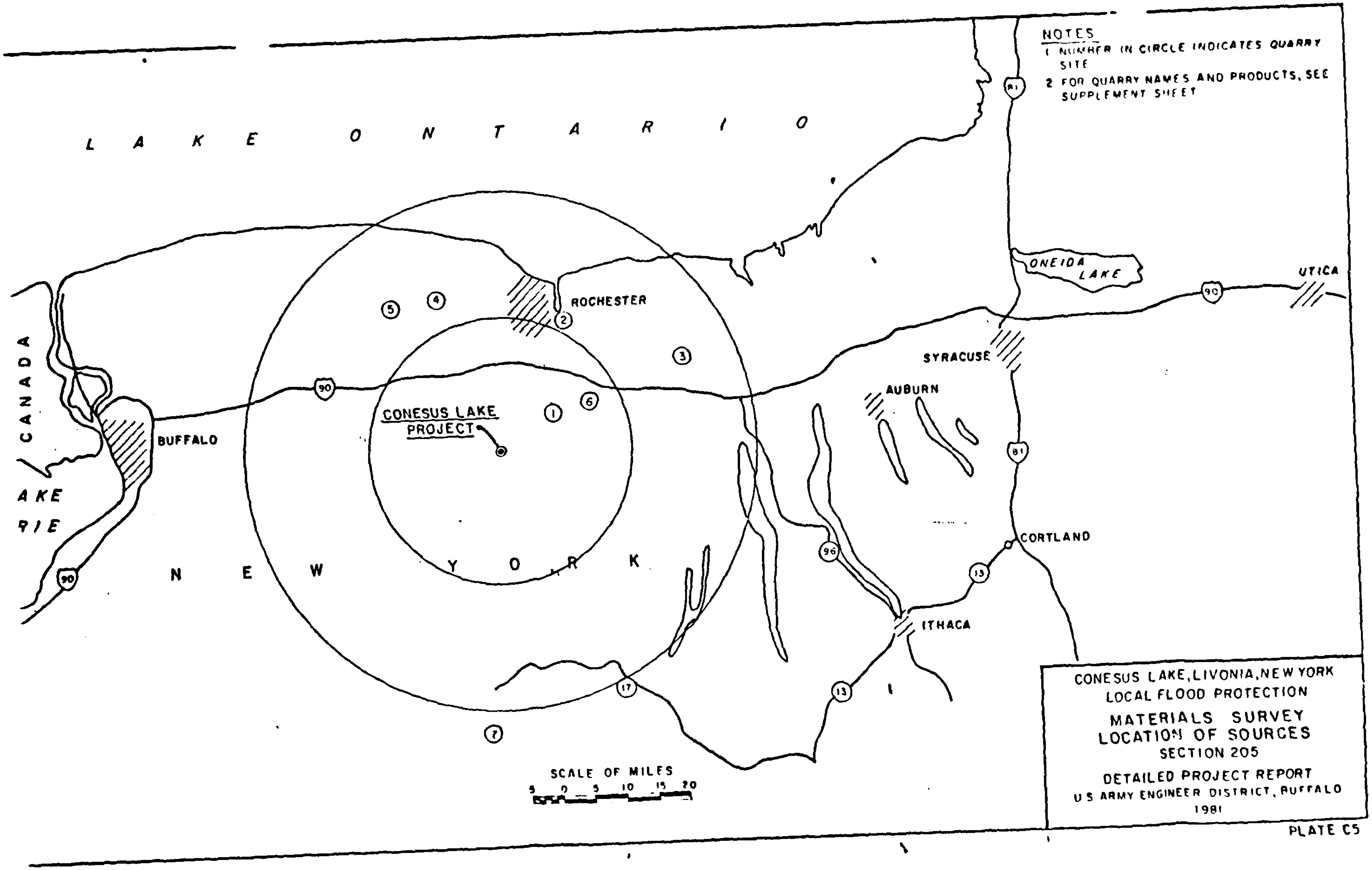
CONESUS LAKE
LIVONIA, NEW YORK

LOCAL FLOOD PROTECTION
SECTION 205

GEOLOGIC SECTION
STATION 106+40 AND STATION 113+00

U.S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE C4.E



CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

MATERIALS SURVEY
LOCATION OF SOURCES
SECTION 205

DETAILED PROJECT REPORT
U S ARMY ENGINEER DISTRICT, BUFFALO
1981

PLATE C5

MAP SUPPLEMENT SHEET
SUMMARY OF POSSIBLE SOURCES FOR CONSTRUCTION MATERIALS

SITE NUMBER	SOURCE	QUARRY OR PIT LOCATION	RADIAL DISTANCE	BEDDING/FILTER	RIPRAP	BEDDING	COARSE AGGREGATE	FINE AGGREGATE
1.	GENERAL CRUSHED STONE CO.	HONEOYE FALLS, N.Y.	11 MI.	X	X	X		
2.	DOLOMITE PRODUCTS CO.	PENFIELD, N.Y.	25 MI.	X	X	X	X	
3.	ABRAM CLEASON CO., INC.	NEWARK, N.Y.	31 MI.					X
4.	CONCRETE MATERIALS, INC.	SWEDEN, N.Y.	28 MI.	X		X	X	
5.	CLARENDON STONE PRODUCTS	CLARENDON, N.Y.	31 MI.	X		X	X	
6.	POTTER DEWITT PIT NO. 3	VICTOR, N.Y.	20 MI.					X
7.	ALFRED ATLAS SAND AND GRAVEL	ALFRED STATION, N.Y.	41 MI.				X	X

NOTES:

X - INDICATES THAT SOURCE CONTAINS SUITABLE IN-PLACE MATERIAL FOR THE PRODUCTION OF MATERIAL TYPES INDICATED.

MATERIAL TYPES AND SIZE RANGE:

BEDDING/FILTER: NO. 200 - 6"
RIPRAP: 12" - 2 POUNDS TO 25 POUNDS
BEDDING: 1/2" - 2"
COARSE AGGREGATE: NO. 8 - 1 1/2"
FINE AGGREGATE: NO. 200 - 3/8"

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION
MATERIALS SURVEY
SUMMARY OF SOURCES
SECTION 205
DETAILED PROJECT REPORT
U S ARMY ENGINEER DISTRICT, BUFFALO
1981

PLATE C6

SOURCE	ROCK TYPE	PROPOSED USE	RADIA DISTAN
GENERAL CRUSHED STONE CO. QUARRY AT HONEOYE FALLS, N.Y. OFFICE AT HONEOYE FALLS, N.Y.	ONONDAGA LIMESTONE	BEDDING/FILTER BEDDING RIPRAP	11 MIL
DOLOMITE PRODUCTS CO. QUARRY AT PENFIELD, N.Y. OFFICE AT ROCHESTER, N.Y.	LOCKPORT DOLOMITE	BEDDING/FILTER BEDDING, RIPRAP, COARSE AGGREGATE	25 MIL
ABRAM CLEASON CO., INC. PIT AT NEWARK, N.Y. OFFICE AT NEWARK, N.Y.	GLACIAL DRIFT	FINE AGGREGATE	31 MIL
CONCRETE MATERIALS, INC. QUARRY AT SWEDEN, N.Y. OFFICE AT SWEDEN, N.Y.	LOCKPORT DOLOMITE	BEDDING/FILTER BEDDING COARSE AGGREGATE	28 MIL
CLARENDON STONE PRODUCTS QUARRY AT CLARENDON, N.Y. OFFICE AT CLARENDON, N.Y.	LOCKPORT DOLOMITE	BEDDING/FILTER BEDDING COARSE AGGREGATE	31 MI
POTTER-DEWITT PIT #3 PIT AT VICTOR, NEW YORK OFFICE AT PAVILION, N.Y.	GLACIAL DELTA	FINE AGGREGATE	20 MI (
ALFRED ATLAS SAND AND GRAVEL PIT AT ALFRED STATION, N.Y. OFFICE AT ALFRED STATION, N.Y.	GLACIAL OUTWASH	COARSE AGGREGATE FINE AGGREGATE	41 M

D USE	RADIAL DISTANCE	LABORATORY TEST RECORD			DA
		DATE TESTED	LABORATORY	PROJECT FOR WHICH TESTED	
R	11 MILES	JULY 1976 DECEMBER 1971	ORDL 103/76.623B ORDL 103/72.602C	OSWEGO DIKE DISPOSAL WELLSVILLE RECTIFICATION	UNKNOWN UNKNOWN
ER RAP, GATE	25 MILES	JULY 1976 JUNE 1973	ORDL 103/76.623B ORDL 103/73.630C	OSWEGO DIKE DISPOSAL DIKE DISPOSAL PROGRAM	UNKNOWN UNKNOWN
TE	31 MILES	SEPTEMBER 1974 SEPTEMBER 1978	ORDL 103/75.605B ORDL 103/78.628B	GREAT SODUS BAY HARBOR, N.Y. LITTLE SODUS BAY-WEST PIER REPAIR	1974-197 1978
ER GATE	28 MILES	NOVEMBER 1970	ORDL 101/71.362C	ROCHESTER HARBOR, N.Y.-EAST PIER REPAIR	1970
ER GATE	31 MILES	MAY 1972 MARCH 1981	ORDL 103/72.610C ORDL 103/81.608B	OAK ORCHARD HARBOR, N.Y. ROCHESTER HARBOR, WEST PIER	UNKNOWN UNKNOWN
TE	20 MILES	MARCH 1981	ORDL 103/81.608B	ROCHESTER HARBOR, N.Y. WEST PIER REPAIR	UNKNOWN
GATE TE	41 MILES	SEPTEMBER 1976 AUGUST 1974	ORDL 101/76T.309B NYSDOT 74118N	WELLSVILLE RECTIFICATION GENERAL PURPOSE (EXPOSED CONCRETE)	1976 UNKNOWN

RD	SERVICE RECORD		
T FOR WHICH TESTED	DATE USED	PROJECT	EVALUATION
IKE DISPOSAL LE RECTIFICATION	UNKNOWN UNKNOWN	UNKNOWN UNKNOWN	UNKNOWN UNKNOWN
KE DISPOSAL POSAL PROGRAM	UNKNOWN UNKNOWN	UNKNOWN UNKNOWN	UNKNOWN UNKNOWN
US BAY HARBOR. N.Y. DUS BAY-WEST PIER REPAIR	1974-1975 1978	GREAT SODUS BAY HARBOR, N.Y.-EAST PIER REPAIR LITTLE SODUS BAY-WEST PIER REPAIR	SATISFACTORY SATISFACTORY
R HARBOR, N.Y.-EAST PIER	1970	ROCHESTER HARBOR, N.Y.-EAST PIER REPAIR.	SATISFACTORY
ARD HARBOR, N.Y. R HARBOR, WEST PIER	UNKNOWN UNKNOWN	UNKNOWN UNKNOWN	UNKNOWN UNKNOWN
R HARBOR, N.Y. R REPAIR	UNKNOWN	UNKNOWN	UNKNOWN
LE RECTIFICATION PURPOSE (EXPOSED CONCRETE)	1976 UNKNOWN	WELLSVILLE, N.Y. 2ND RECTIFICATION UNKNOWN	SATISFACTORY UNKNOWN

EVALUATION	REMARKS
N N	QUARRY PRODUCES TO MEET NYS DOT GRADATION SPECS. MATERIAL CONTAINS AN ABUNDANCE OF PORCELLANEOUS CHERT, CHERT NODULES AND BANDS. NOT ACCEPTABLE FOR CONCRETE AGGREGATES.
N N	QUARRY PRODUCES TO MEET NYS DOT GRADATION SPECS. DECEW MEMBER IS NOT ACCEPTABLE FOR USE. SELECTIVE QUARRYING IS REQUIRED.
ACTORY FACTORY	
ACTORY	QUARRY PRODUCES CRUSHED MATERIALS TO MEET NYS GRADATION SPECS.
WN WN	QUARRY PRODUCES CRUSHED MATERIALS TO MEET NYS GRADATION SPECS. TEST RESULT BY PHONE 3-24-81 INDICATE MATERIAL IS ACCEPTABLE FOR CONCRETE.
WN	TEST RESULTS BY PHONE 3-24-81, MATERIAL ACCEPTABLE FOR CONC.
FACTORY WN	LOW ALKALI CEMENT REQUIRED.

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

MATERIALS SURVEY
POSSIBLE SOURCES
SECTION 205

DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT, BUFFALO

PLATE 67

SOURCE	FORMATION	PROPOSED USE	LAB. NO.	P
GENERAL CRUSHED STONE CO. QUARRY AT HONEOYE FALLS, N.Y. OFFICE AT HONEOYE FALLS, N.Y.	ONONDAGA LIMESTONE	BEDDING/FILTER BEDDING RIPRAP	ORDL 103/76.623B	LEDGE ROCK: ARGILL BROWN CARBONEOUS S PYRITE AND CHALCED LEDGE ROCK: CHERTY WITH ~~CALCITE, DISS~~ LY HARD, DENSE, DU
			ORDL 103/72.602C	LEDGE ROCK: CHERTY TEXTURE), CONTAINS YELLOWISH BROWN.
				LEDGE ROCK: CHERTY TEXTURE), LARGE CH DOLOMITIC, DUSKY Y
DOLOMITE PRODUCTS CO. QUARRY AT PENFIELD, N.Y.	LOCKPORT DOLOMITE	BEDDING/FILTER BEDDING RIPRAP COARSE AGGREGATE	ORDL 103/76.623B	LEDGE ROCK: DOLOMI FRIABLE SURFACE DU LEDGE ROCK: DOLOMI PARTINGS, HARD, DE CRYSTALS AND SOME
				LEDGE ROCK: SANDY AND STYLOLITES, HA AND CALCITE, DUSKY
				LEDGE ROCK: SANDY VERY DENSE, DOLOMI LEDGE ROCK: SANDY TEXTURED, DOLOMITE YELLOWISH BROWN.
ABRAM CLEASON CO., INC. PIT AT NEWARK, N.Y. OFFICE AT NEWARK, N.Y.	GLACIAL DRIFT	FINE AGGREGATE	ORDL 103/75.605B ORDL 103/75.628B	QUARTZ- 23%; LIMES IGNEOUS AND METAMO FRAGS - 1%; SHALE QUARTZ AND QUARTZ SILTSTONE - [illegible] : - TRACE: SHALE -

SUMMARY SHEET FOR LABORATORY

NO.	PETROGRAPHIC ANALYSIS	SP. GRAV.	ABS.	$MgSO_4$	L.A.A.	F&E PART
		TEST RESULTS				
123B	LEDGE ROCK: ARGILLACEOUS LIMESTONE; THIN TO MEDIUM-BEDDED, CONTAINS DARK BROWN CARBONEOUS SHALE SEAM, MODERATELY HARD, FINE-GRAINED, TRACES OF PYRITE AND CHALCEDONY, DUSKY YELLOWISH-BROWN.	2.7	0.23%			
	LEDGE ROCK: CHERTY ARGILLACEOUS LIMESTONE; MEDIUM BEDDED TO MASSIVE CHERTY WITH CALCITE, DISSEMINATED CLAY, FINE SILT AND PYRITE CRYSTALS; MODERATELY HARD, DENSE, DUSKY YELLOWISH BROWN.	2.68	0.28%			
502C	LEDGE ROCK: CHERTY LIMESTONE; HARD, DENSE, (FINE-GRAINED, LITHOGRAPHIC TEXTURE), CONTAINS PORCELLANEOUS CHERT NODULES, SLIGHTLY DOLOMITIC, DARK YELLOWISH BROWN.	2.7	.35%			
	LEDGE ROCK: CHERTY LIMESTONE; HARD, DENSE, (FINE-GRAINED, LITHOGRAPHIC TEXTURE), LARGE CHERT NODULES AND LENSES OF PORCELLANEOUS CHERT, SLIGHTLY DOLOMITIC, DUSKY YELLOWISH BROWN.	2.64	0.41%			
623B	LEDGE ROCK: DOLOMITE, SOFT, DENSE (FINE CRYSTALLINE, SUGARY TEXTURED) FRIABLE SURFACE DUE TO SELECTIVE LEACHING, BROWN TO YELLOWISH BROWN.	2.72	1.8%			
	LEDGE ROCK: DOLOMITE, THIN-BEDDED TO MASSIVE, CONTAINS STYLOLITIC SHALE PARTINGS, HARD, DENSE (DOLOMITE AND CALCITE CRYSTALS) WITH LARGER DOLOMITE CRYSTALS AND SOME SPHALERITE, BROWNISH GRAY.	2.80	0.4%			
	LEDGE ROCK: SANDY DOLOMITE; THIN BEDDED WITH CARBONACEOUS BEDDING PLANES AND STYLOLITES, HARD, VERY DENSE, WITH DOLOMITE, QUARTZ SAND/SILT GRAINS AND CALCITE, DUSKY YELLOWISH BROWN.	2.69	0.67%			
	LEDGE ROCK: SANDY DOLOMITE; BANDED TO MASSIVE, HARD, FINELY CRYSTALLINE-VERY DENSE, DOLOMITE CRYSTALS AND QUARTZ GRAINS, DUSKY BROWN.	2.7[illegible]	[illegible]			
	LEDGE ROCK: SANDY DOLOMITE; MASSIVE, HARD, VERY DENSE-CRYSTALLINE-SUGARY TEXTURED, DOLOMITE CRYSTALS W/CLEAR QUARTZ GRAINS AND CALCITE, DUSKY YELLOWISH BROWN.	2.76	0.53%			
605B	QUARTZ- 23%; LIMESTONE AND DOLOMITE - 11%; SANDSTONE AND SILTSTONE - 51%; IGNEOUS AND METAMORPHIC ROCK FRAGMENTS - 6%; CHERT - 2%; WEATHERED ROCK - FRAGS - 1%; SHALE - 6%.	2.63	1.5%	22.9%	-	4%
[illegible]28[illegible]	QUARTZ AND QUARTZITE - 33%; LIMESTONE AND DOLOMITE - 40%; SANDSTONE AND SILTSTONE - [illegible]; IGNEOUS AND METAMORPHIC ROCK FRAGS - [illegible]; WEATHERED ROCKS - TRACE; SHALE - TRACE.	2.51	2.60%			2.13%

2

ORY TESTING

ESULTS						
F&E PART	L.W PART	SO. PART	CLAY LUMPS	WET-DRY (80 CYCLES)	FREEZE-THAW (35 CYCLES)	
						SAMPLE NO. GC SAMPLE NO. GC
				NO CHANGE (GH-1)	GH-2 CHERT-LS CONTACTS PARTIALLY BROKEN DUE TO DIFFERENTIAL THERMAL EXPANSION. CHERT SEVERELY FRACTURED.	
				CHERT-LIMESTONE CONTACTS PARTIALLY BROKEN DUE TO THERMAL EXPANSION (INFRA-RED LAMP)	CHERT HIGHLY FRACTURED DUE TO THERMAL STRESSES.	SAMPLE GH-4
				RECORDED WEIGHT LOSS -0.05% DID NOT BREAK ALONG STYLOLITES.	RECORD WEIGHT LOSS 0.73	SAMPLE NO. [illegible] SAMPLE NO. D
				RECORDED WEIGHT LOSS - 0.13%	RECORDED WEIGHT LOSS-0.28%. DID NOT BREAK ALONG SHALE LAMINAE OR *STYLOLITES*.	SAMPLE NO. D SAMPLE NO. D
					RECORDED WEIGHT LOSS 0.35%	SAMPLE NO. D
4% 2.13%						
						C
						U

DRY (80 CYCLES)	FREEZE-THAW (35 CYCLES)	REMARKS
		SAMPLE NO. GCS-HF1 SAMPLE NO. GCS-HF2
IGE (GH-1)	GH-2 CHERT-LS CONTACTS PARTIALLY BROKEN DUE TO DIFFERENTIAL THERMAL EXPANSION. CHERT SEVERELY FRACTURED.	
LIMESTONE CONTACTS PAR BROKEN DUE TO THERMAL ION (INFRA-RED LAMP)	CHERT HIGHLY FRACTURED DUE TO THERMAL STRESSE.	SAMPLE GH-4
D WEIGHT LOSS -0.05 I BREAK ALONG STYLOLI-	RECORD WEIGHT LOSS 0.73	SAMPLE NO. DP-P-TLT1 (OAK ORCHARD MEMBER). SAMPLE NO. DP-P-TLT2
ED WEIGHT LOSS - 0.13%	RECORDED WEIGHT LOSS-0.28%. DID NOT BREAK ALONG SHALE LAMINAE OR STYLOLITES.	SAMPLE NO. DP-P-TLB-1 PENFIELD MEMBER. SAMPLE NO. DP-P-TLB-2
	RECORDED WEIGHT LOSS 0.35%	SAMPLE NO. DP-P-BL-T

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

SUMMARY OF LABORATORY TEST RESULTS

SECTION 205

DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

4

PLATE C8

SOURCE	FORMATION	PROPOSED USE	LAB. NO.	
CONCRETE MATERIALS, INC. QUARRY AT SWEDEN, N.Y. OFFICE AT SWEDEN, N.Y.	LOCKPORT DOLOMITE	BEDDING/FILTER BEDDING COARSE AGGREGATE	ORDL 101/71.362C	DOLOMITE LIMESTO LIMESTONE - 26%.
CLARENDON STONE PRODUCTS QUARRY AT CLARENDON, N.Y. OFFICE AT CLARENDON, N.Y.	LOCKPORT DOLOMITE	BEDDING/FILTER BEDDING COARSE AGGREGATE	ORDL 101/72.610C	DOLOMITE - 89%; TRACE
			ORDL 103/81.608B	NYSDOT SIZE #1 (SHALY DOLOMITE - NYSDOT SIZE #2 (SHALY DOLOMITE -
POTTER DEWITT PIT NO. 3 PIT AT VICTOR, N.Y. OFFICE AT PAVILION, N.Y.	GLACIAL DELTA	FINE AGGREGATE	ORDL 103/81.608D	QUARTZ AND QUART SILTSTONE - 30%;
ALFRED ATLAS SAND AND GRAVEL PIT AT ALFRED STATION, N.Y. OFFICE AT ALFRED STATION, N.Y.	GLACIAL OUTWASH	FINE AGGREGATE	ORDL 101/76.326B	QUARTZ AND QUART SILTSTONE - 33%; - 6%;
		COARSE AGGREGATE	ORDL 101/76.32[illegible]B	QUARTZITE - 13% - 45%; GRANITIC SILTSTONE, CLAY

SUMMARY SHEET FOR LABORATORY TEST

	TEST RESULTS					
PETROGRAPHIC ANALYSIS	SP. GRAV.	ABS.	$MgSO_4$	L.A.A.	F&E PART	L.W. PA
ITE LIMESTONE - 70%; SHALY DOLOMITIC LIMESTONE - 4%; FOSSILIFEROUS STONE - 26%.	2.76	1.05%	6.78%	21.2%	15%	
MITE - 89%; SHALY DOLOMITE - 8%; WEATHERED DOLOMITE - 3%; SHALE-E	2.76	1.23%	5.0%	28%	9%	
OT SIZE #1 (#4 TO 3/4") - DOLOMITE - 74%; ARGILLACEOUS DOLOMITE - 17%; Y DOLOMITE - 6%; SHALY ARGILLACEOUS DOLOMITE - 3%.	2.75	1.32%	5.0%	25%	8%	
OT SIZE #2 (3/4"- 1 1/2") DOLOMITE -58%; ARGILLACEOUS DOLOMITE-31%; Y DOLOMITE - 3%; SHALY ARGILLACEOUS DOLOMITE - 8%.	2.75	1.45%	5.0%	29%	10%	
TZ AND QUARTZITE - 26%; LIMESTONE AND DOLOMITE - 37%; SANDSTONE AND STONE - 30%; IGNEOUS AND METAMORPHIC ROCKS - 5%; WEATHERED ROCKS-2%.	2.65	1.29%	22%	-	-	
TZ AND QUARTZITE - 25%; LIMESTONE AND DOLOMITE - 26%; SANDSTONE AND STONE - 33%; IGNEOUS ROCK - 5%; CHERT - 5%; WEATHERED ROCK AND SHALE %;	2.51	1.73%	25.64%			
RTZITE - 13%; LIMESTONE AND DOLOMITE - 29%; SANDSTONE AND SILTSTONE 5%; GRANITIC IGNEOUS ROCK - 4%; CHERT - 7%; WEATHERED SANDSTONE, TSTONE, CLAYSTONE AND SHALE - 2%.	2.63	1.59%	9.74%	2.32%	I	0.04%

ORY TESTING

ESULTS

.	F & E PART	L.W. PART	SO. PART	CLAY LUMPS	WET-DRY (80 CYCLES)	FREEZE-THAW (35 CYCLES)	
	15%						
	9%						
	8% 10%						
	-						
							LOW ALKALI (
	1	0.04%					LOW ALKALI (
							(
							L

3

...Y (80 CYCLES)	FREEZE-THAW (35 CYCLES)	REMARKS
		LOW ALKALI CEMENT REQUIRED.
		LOW ALKALI CEMENT REQUIRED.

CONESUS LAKE, LIVONIA, NEW YORK
LOCAL FLOOD PROTECTION

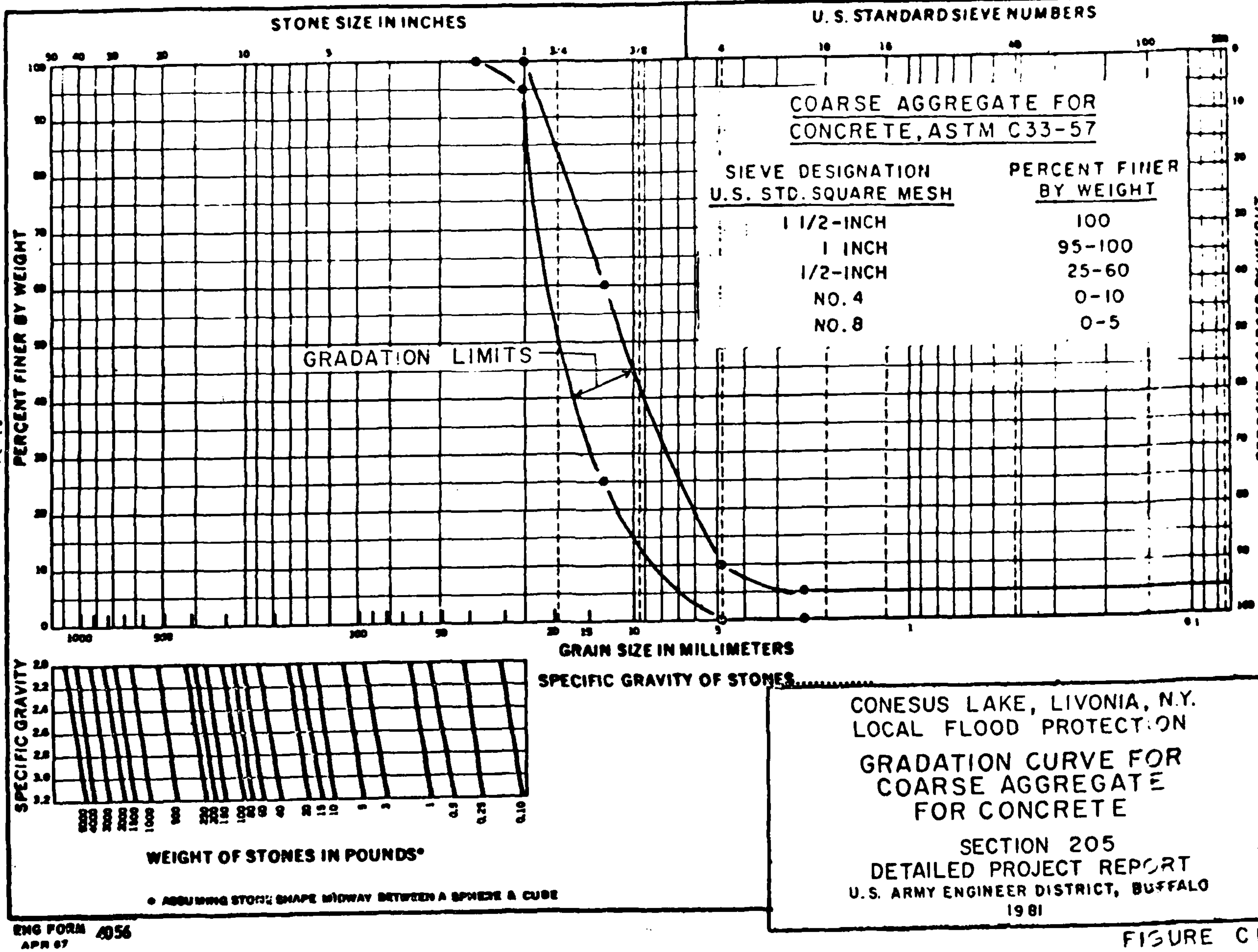
SUMMARY OF LABORATORY TEST RESULTS

SECTION 205

DETAILED PROJECT REPORT

U.S. ARMY ENGINEER DISTRICT, BUFFALO

1981

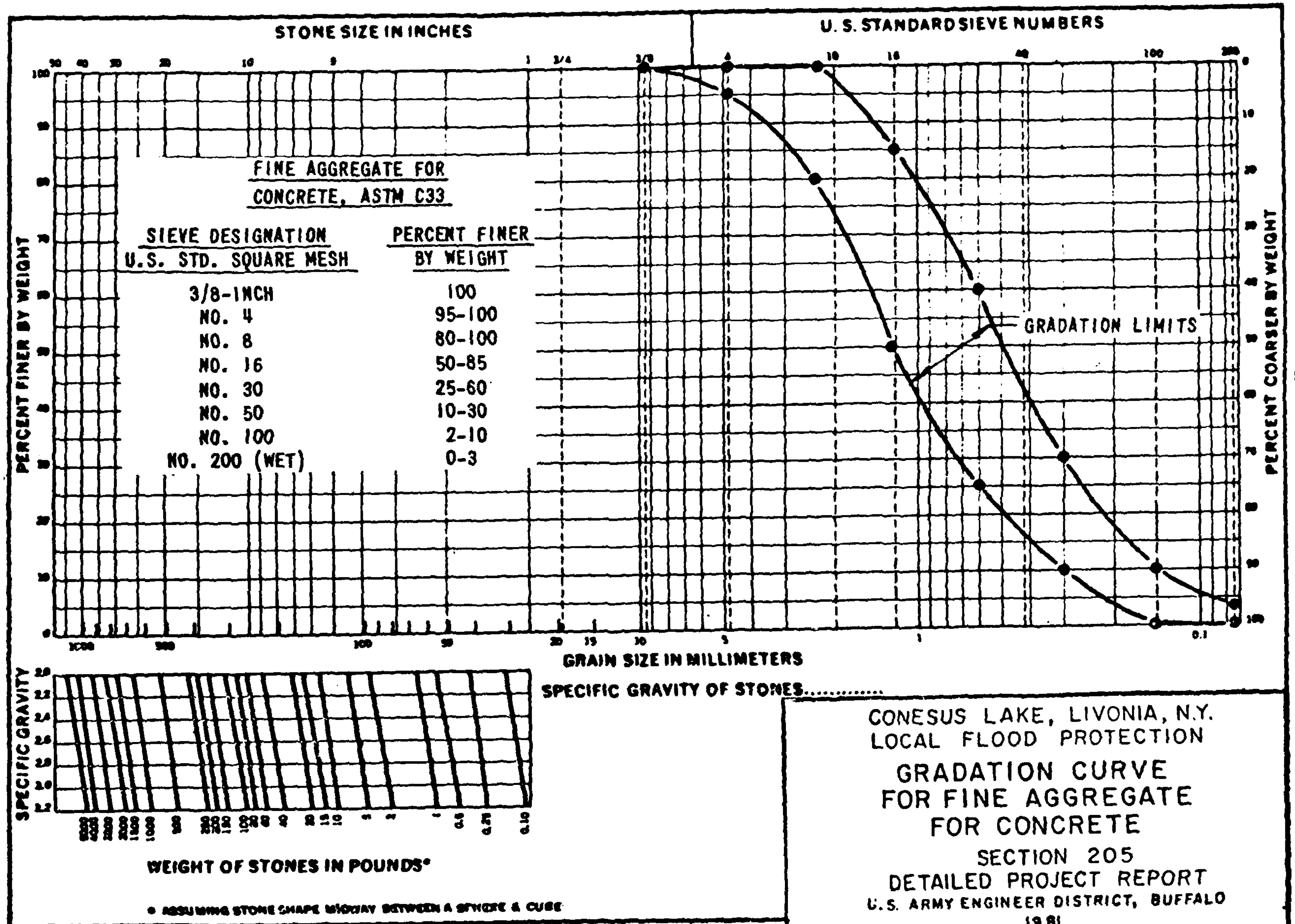


CONESUS LAKE, LIVONIA, N.Y.
LOCAL FLOOD PROTECTION

GRADATION CURVE FOR
COARSE AGGREGATE
FOR CONCRETE

SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE C11



FINE AGGREGATE FOR CONCRETE, ASTM C33

SIEVE DESIGNATION U.S. STD. SQUARE MESH	PERCENT FINER BY WEIGHT
3/8-INCH	100
NO. 4	95-100
NO. 8	80-100
NO. 16	50-85
NO. 30	25-60
NO. 50	10-30
NO. 100	2-10
NO. 200 (WET)	0-3

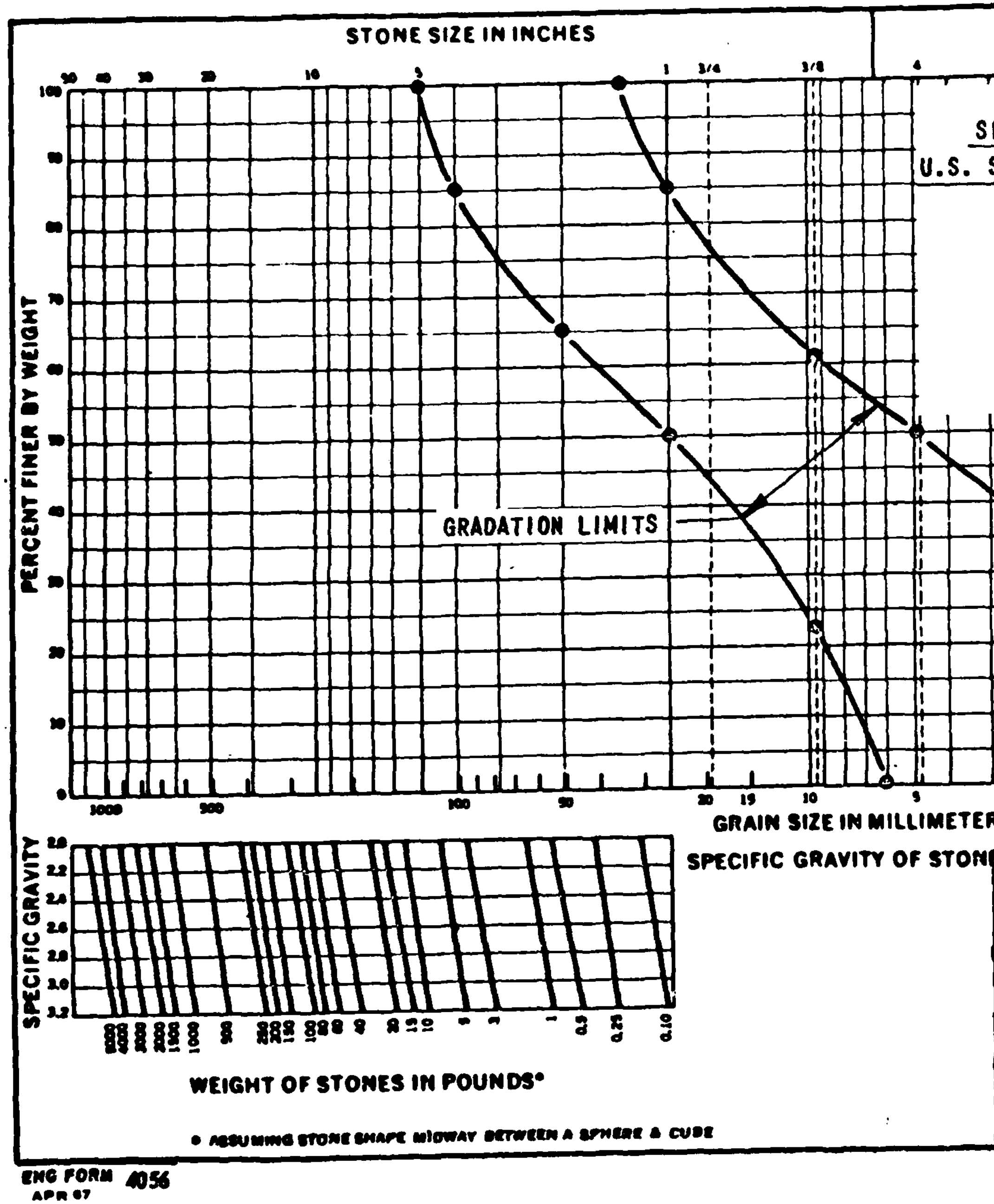
CONESUS LAKE, LIVONIA, N.Y.
LOCAL FLOOD PROTECTION

GRADATION CURVE
FOR FINE AGGREGATE
FOR CONCRETE

SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

ENG FORM 4056
APR 67

FIGURE C12



BEDDING/FILTER FOR RIPRAP

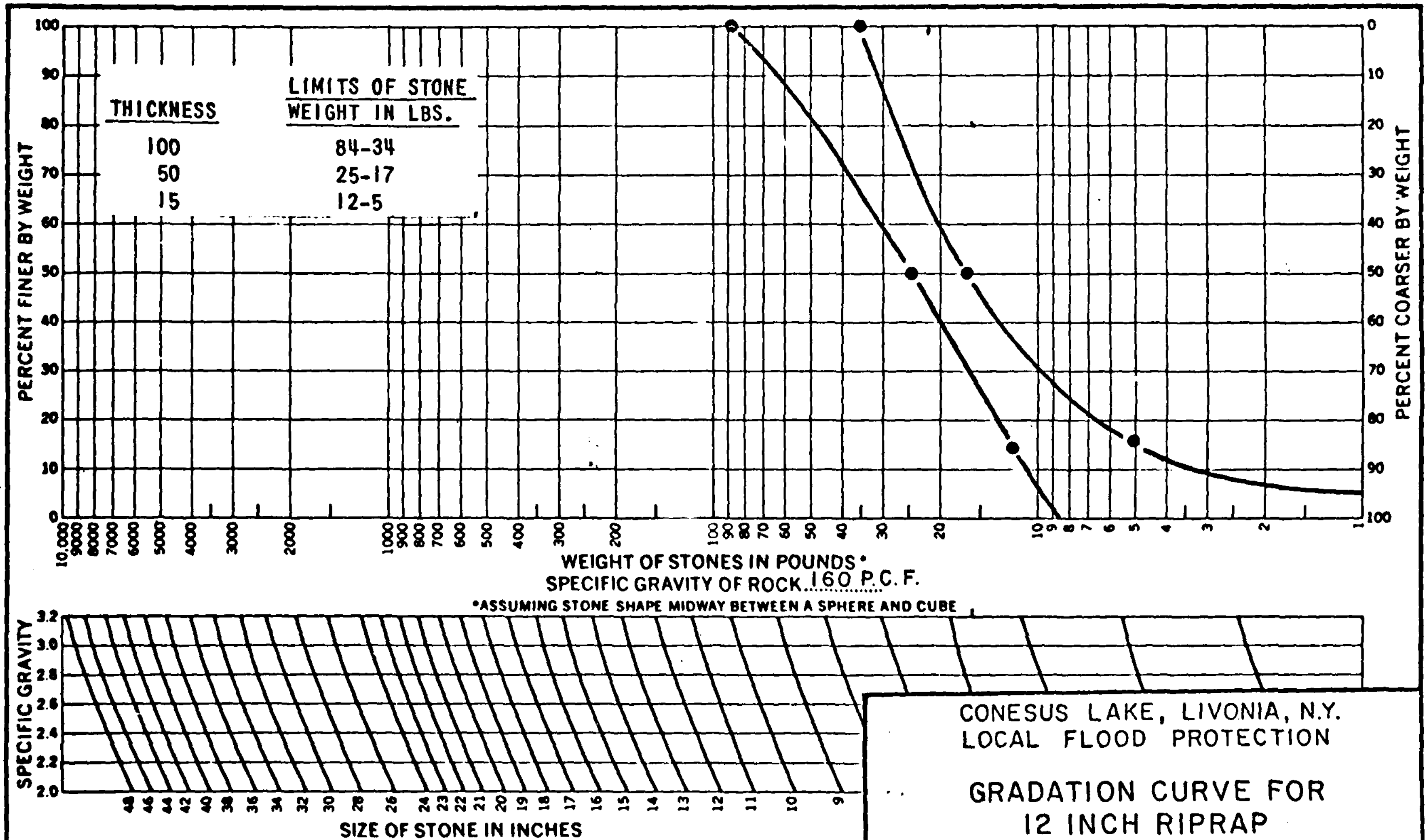
SIEVE DESIGNATION U.S. STANDARD SQUARE MESH	PERCENT FINER BY WEIGHT
6 INCHES	100
2 INCHES	65-100
1 INCH	50-85
3/8 INCH	25-60
NO. 4	0-50
NO. 40	0-15
NO. 200	0-5

CONESUS LAKE, LIVONIA, N.Y.
LOCAL FLOOD PROTECTION

GRADATION CURVE FOR BEDDING/FILTER FOR RIPRAP

SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

FIGURE C13



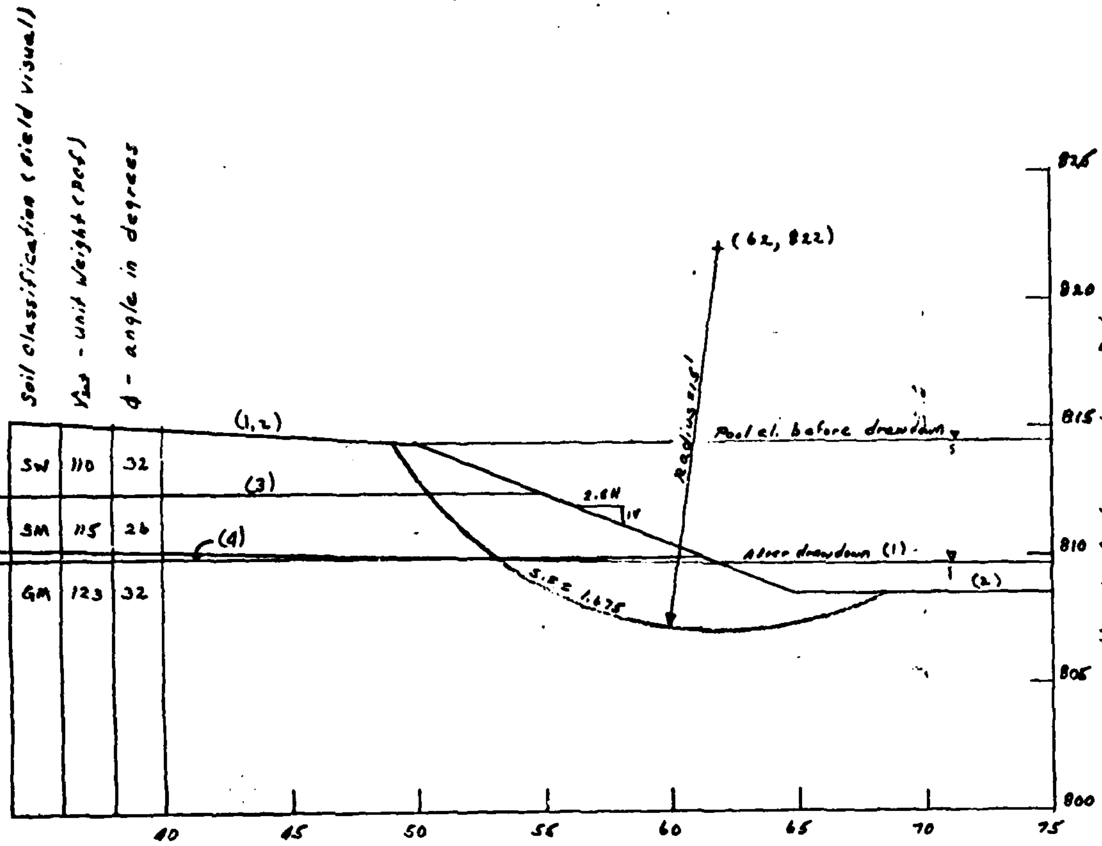
CONESUS LAKE, LIVONIA, N.Y.
LOCAL FLOOD PROTECTION

GRADATION CURVE FOR
12 INCH RIPRAP

SECTION 205
DETAILED PROJECT REPORT
U.S. ARMY ENGINEER DISTRICT, BUFFALO
1981

ENG FORM 4055

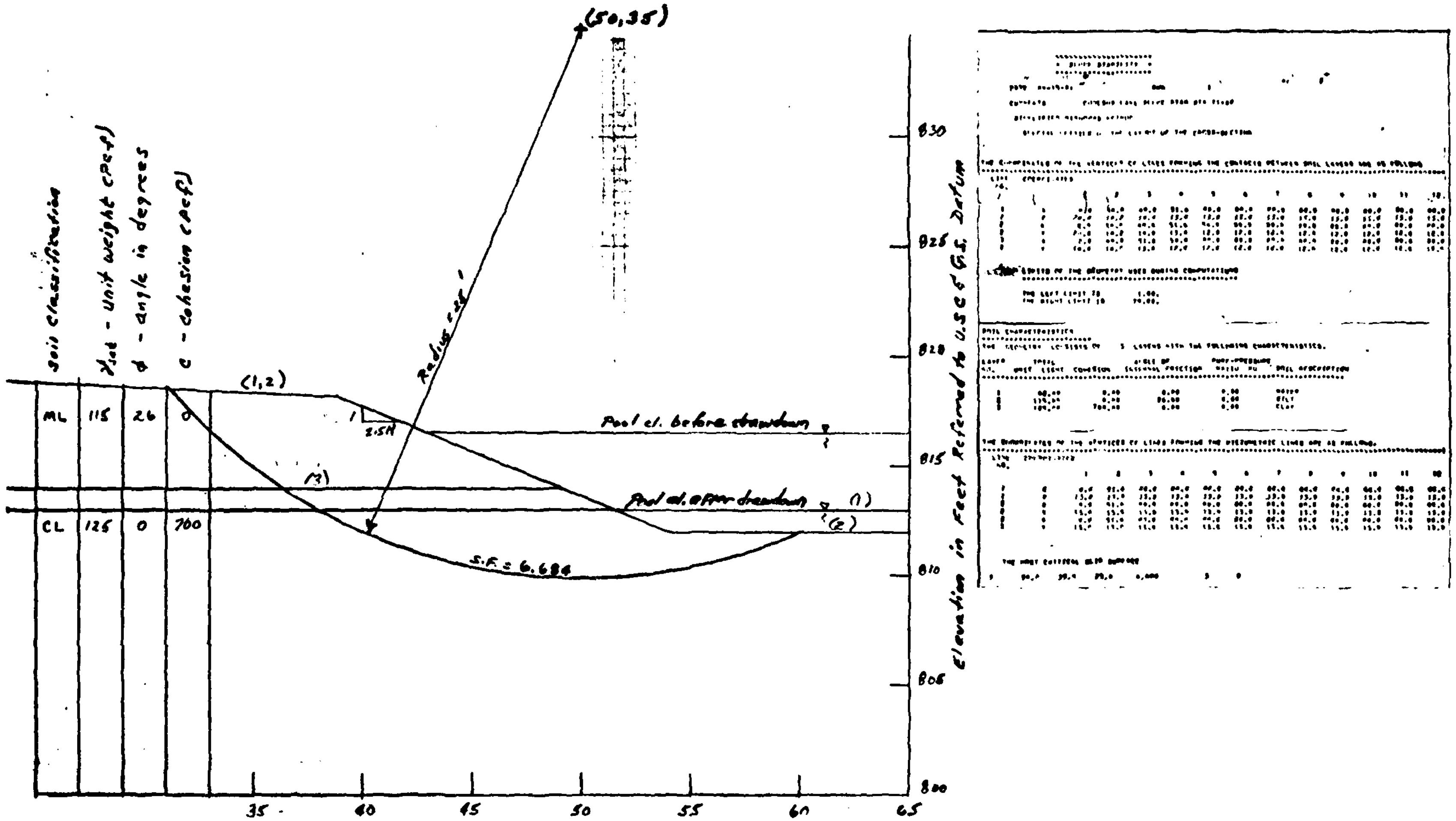
FIGURE C14



NOTES:
1. Soil information for section from test pit TP81-4.
2. Condition represents sudden drawdown (EM 1110-2-1902, Appendix VI)
3. Parameters used for friction angle (ϕ) extracted from "Basic Soils Engineering," Hough, B.K., 2nd edition 1969, Pg. 181 Table 6-1.
4. Parameters used for sat unit wt. (γ_{sat}) extracted from "Basic Soils Engineering," Hough, B.K., 2nd edition 1969, Pg. 35 Table 2-3.

CONESUS LAKE
LIVONIA, NEW YORK
FLOOD CONTROL PROJECT
SLOPE STABILITY
STA. 55+00

FIGURE C15



NOTES:

1. Soil information for section from boring ABI-6.
2. Condition represents sudden drawdown (EM 1110-2-1902, Appendix VI.
3. For parameters used for section see Table C-1 Pg. C-4.

CONESUS LAKE
LIVONIA, NEW YORK
FLOOD CONTROL PROJECT
SLOPE STABILITY
STA 71+00

FIGURE C16

Subject: Conesus Lake

Computation of: Side Slopes

Computed by: JJC   Checked by: [illegible]   Date: 3/24/81

Note: Presumptive soil parameters used. Based on N.Y.S.D.O.T. Borings + Field Samples taken 12/81

Assume: an infinite slope.

② Bank cut material: Silty Sand, trc grv, mst, dk brn.

③ No rapid drawdown, no steady state seepage

Analysis based on EM-1110-2-1902, Appendix V "Infinite Slope Analysis of Cohesionless Soils".

MATERIAL	Presumptive Material Properties			
	γ_{DRY} (pcf)	γ_{SAT} (pcf)	ϕ (°)	c (psf)
SILTY SAND, trace gravel	110	115	26	0
SILTS (non plastic)	110	115	26	0

Taken from B.K. HOUGH "BASIC SOILS ENGINEERING" pg. 181, Table 2-3.

FOR GRANULAR MATERIAL

$$F.o.S. = \frac{\tan\phi}{\tan\beta} = \frac{\tan 26^\circ}{\cancel{\tan}\ .3333} = \frac{.4877}{.3333} = 1.47 \cong 1.5$$

β = angle of inclination of Backfill

$\beta = 18.43^\circ$

Subject: Conesus Lake, Stage II DPR
Computation of: Riprap size for slopes.
Computed by: JJC Checked by: ____ Date: ____

Local Boundry Shear. (EQ 32, EM 1110-2-1601)

$$\tau_0 = \frac{\gamma \bar{V}^2}{\left(32.6 \log \frac{12.2y}{D_{50}}\right)^2} \times 1.5$$

τ_0 = Local boundry shear $\bar{V}$ = 3.9 ft/sec

γ = unit weight of water 62.4 lbs/ft³ y = Depth of channel, 5.0'

D_{50} = ave stone diam. 1.5 = factor of safety.

From Inclosure 1, ETL-2-120 Specific Weight = 160 lbs/ft³

12 inch Riprap Weight in pounds From Plate 30, EM 1110-2-

W_{100}	84-34	D_{50} = .65-.58
W_{50}	25-17	
W_{15}	12-5	

$$\therefore \tau_0 = \frac{(62.4)(3.9)^2}{\left(32.6 \log \frac{12.2(5.0)}{.65}\right)^2} \times 1.5 = .34 \text{ lbs/ft}^2$$

Design Shear. using D_{50} min. = .58

τ = 2.3 lbs/ft² from plate 35, EM 1110-2-1601

$K_1 = (1 - \sin^2\phi / \sin^2\theta)^{1/2}$

where ϕ angle of side slope w/ horizontal (18.43°)
θ angle of repose of riprap = (40°)

$$\text{Design Shear} = \overset{K_1}{(.87)} \cdot \overset{\tau}{(2.3)} = \underline{\underline{2.00 \text{ lb/ft}^2 > .34 \text{ lbs/ft}^2}}$$

Subject: Conesus Lake, Stage II DPR
Computation of: Riprap Bedding
Computed by: JJC Checked by: [illegible] Date: 4/2/81

For 12 inch Riprap with $\gamma = 160$ lbs/ft² (ETL 1110-2-1601)

$W_{100} = 84 - 34$ lbs. $D_{100} = 1.0 - .75$ use .88 = 10.5" = 270 mm

$W_{50} = 26 - 17$ lbs. $D_{50} = .68 - .59$ use .64 = 7.6" = 195 mm

$W_{15} = 12 - 5$ lbs. $D_{15} = .54 - .39$ use .47 = 5.6" = 140 mm

For Soil: from gradation curves:

$D_{15} = .01$ mm

$D_{50} = .15$ mm

$D_{85} = .5$ mm

Bedding Design Criteria Per EM 1110-2-1901:

1) $\frac{D_{15}(S_t)}{D_{15}(B)} \geq 5$ $D_{15}(B) \cdot 5 \leq \cancel{180}\ 140$ mm $D_{15}(B) \leq 28$ mm

2) $\frac{D_{15}(B)}{D_{15}(S)} \geq 5$ $D_{15}(B) \geq .01 \text{mm} \cdot 5$ $D_{15}(B) \geq .05$ mm

3) $\frac{D_{15}(S_t)}{D_{85}(B)} < 5$ $D_{85}(B) \geq \frac{140 \text{mm}}{5}$ $D_{85}(B) \geq 28$ mm

4) $\frac{D_{15}(B)}{D_{85}(S)} < 5$ $D_{15}(B) \leq 5\ (.5 \text{mm})$ $D_{15} \leq 2.5$ mm

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX D
STRUCTURAL DESIGN

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX D
STRUCTURAL DESIGN

TABLE OF CONTENTS

DETAILED PROJECT REPORT

CONESUS LAKE, NEW YORK

APPENDIX D

STRUCTURAL DESIGN

D1. PURPOSE

D1.1 The following paragraphs cover the design criteria, basic data, and assumptions used in the design of the control structure for the Conesus Lake Flood Management Project on the Conesus Lake Outlet at Lakeville, NY. A brief description of the structures with loading conditions is included to show the design procedure. Typical structure design computations are submitted to assist in the review of the design.

D2. DESIGN CRITERIA

a. Reference. Working stresses, loading conditions, design assumptions, and other criteria are based on the applicable parts of the following references:

(1) EM 1110-1-2101, "Working Stresses for Structural Design"

(2) EM 1110-2-2906, "Design of Pile Structures and Foundations"

(3) ACI 322-79, "Building Code Requirements for Structural Plain Concrete"

(4) "Foundation Analysis and Design" by Bowles

(5) AISC, Manual of Steel Construction, Eighth Edition

b. Allowable Working Stresses.

(1) Concrete. The compressive strength of concrete, f_c', is 3,000 lbs/sq. in. All other stresses are in accordance with the ACI Building Code (ACI 322-79).

(2) Structural Steel. The design of all structural steel is in accordance with the provisions in EM 1110-2-2101 and the AISC Manual of Steel Construction.

D3. BASIC DATA AND ASSUMPTIONS

D3.1 The following data are used in design of structural features:

a. Survey Datum. All elevations are in feet and tenths on the National Geodetic Vertical Datum of 1929 (NGVD).

b. Weights of Material.

(1) Water 62.5 lbs. per cubic foot

(2) Concrete 150 lbs. per cubic foot

(3) Saturated Earth 115 lbs. per cubic foot

(4) Submerged Earth 52.5 lbs. per cubic foot

(5) Moist Earth 110 lbs. per cubic foot

c. Cohesion, c = 0 lbs. per cubic foot.

d. Angle of Internal Friction, 0 = 26°, for all earth and backfill.

The above soil values are presumptive and were supplied by Geotechnical Section based on borings drilled by the New York State Department of Transportation in 1954 in the vicinity of the project site.

e. Basic Loads and Conditions.

(1) Following are three different types of possible loading conditions. However, the structures will only be analyzed for Case I, since the loading due to Case II is negligible and Case III is significantly lower than Case I.

Case I - Normal Condition - Maximum water surface upstream gates at El. 820, water surface downstream gates at El. 814.

Case II - Construction Condition - Due to even ground elevations on both sides of the control structure, construction loads will not affect stability of structural members during any phase of construction.

Case III - Flood Condition - Damage commences when the lake exceeds El. 819.5. The tops of the gates are tentatively set at El. 820. It is assumed the gates will be opened as necessary to maintain the lake at or below El. 819.5. A 0.5-foot allowance is provided for mismanagement of the lake level. As gates are opened, the tailwater rises producing lower differential head than the normal condition. At design discharge, the differential is limited to the head loss caused by the gate frames.

(2) Loading Considered.

a. Horizontal Water Loads.

b. Impact from Drifting Debris. An impact loading of 200 lbs. per linear foot acting on the control structure was considered.

c. Earthquake Loading. An earthquake loading of .1g was considered.

d. Liveloads Due to Personnel Traffic.

D4. STRUCTURES

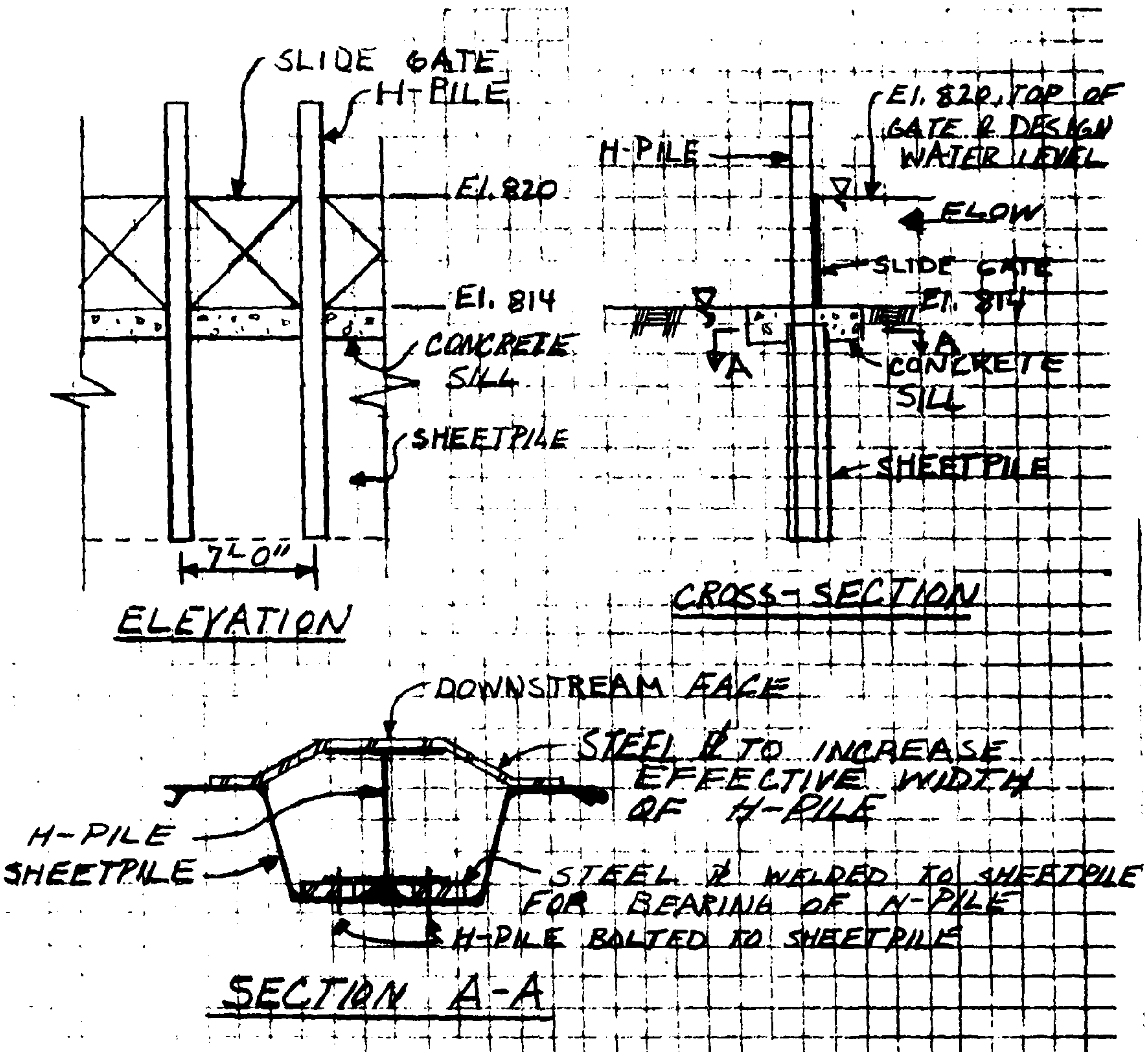
a. Control Structure. The control structure will be located at Station 106+40. The gates for the control structure will be 11 prefabricated steel slide gates equal to Armco model 5-00 gates. Each gate will have a 6' X 6' opening. The gates will rest on a reinforced concrete sill. The gates will be bolted to H-piles which transfer the lateral loads down to surface sheetpile. The H-piles will support a walkway which will provide access for operation and maintenance of the gates. Use of commercially available slide gates limited the gate widths to 6 feet. Manual operation of the gates will be provided wih a gear reduction crank from the same manufacturer. All flows will pass under the gates. The average velocity at design discharge is approximately 4 feet per second. Ice is not anticipated to cause an operational problem due to the submerged outlet, low velocities, the two relatively narrow channels at the lake and the location of the outlet at the north end of the lake.

(1) Loading Conditions and Assumptions. The control structure will be analyzed for Case I only, for the reasons discussed in para. D3. In addition to Case I water loads, the control structure will be designed for either impact or earthquake loading, the most severe load will be determined and used. The walkway will be designed for a live and dead load total of 120 PSF.

(2) Design and Analysis. The control structure H-pile and sheetpile will be designed with the loading from the gates exerted on the H-pile transferred to the sheetpile, which will provide stability in the soil. A bolted connection of the H-pile to the sheetpile will be used to transfer the load at the top of the sheetpile, and at the bottom of the sheetpile the H-pile will bear directly on the sheetpile. For stability of the sheetpile in the soil, a width of 2.5 feet of sheetpile was assumed to act on the soil based on possible sheetpile sizes. This width is conservative due to the reinforced concrete sill transferring loads from H-piles to a greater width of sheetpile at top, but a greater transfer along sheetpile was ignored due to possible future deterioration of concrete sill. The maximum active and passive earth pressures are based on Rankine's formula. The H-pile will be designed to resist bending moment, the sheetpile will be designed to resist bending moments and for embedment length needed for stability, computations are found on sheets 1 through 15. Walkway members were analyzed and designed for bending, shear, tension, compression, and buckling as applicable. The computations are found on sheets 16 through 27. The gates used will be selected from manufacturer's catalogues. No engineering computations are provided for the gates. The concrete sill was reinforced with only temperature and shrinkage steel and was not designed to carry structural loads, see sheets 33 and 34 for computations.

b. Footbridge. A footbridge is proposed to connect the two parts of the trailer park separated by the new channel. Clearance for small boats to pass under the bridge will allow utilization of lake levels in the outlet downstream to the control structure. A commercially available footbridge is chosen for the efficiencies and economy of a manufactured structure. See sheets 28 through 32 of the computations for details.

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by FTL Checked by ________ Date JUNE 81



DESIGN DATA

$\gamma_w = 62.5$ #/ft³ $\phi = 26°$ $K_a = .39$, $K_p = 2.56$

$\gamma_{dry} = 110$ #/ft³ $c = 0$ $K_p - K_a = 2.17$

$\gamma_{sat} = 115$ #/ft³

$\gamma' = 52.5$ #/ft³

$F_y = 38500$ PSI
steel sheetpile

$F_y = 36000$ PSI
H-pile

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by ETL Checked by Date JULY 81

DESIGN - The Control Structure H-pile and sheetpile will be designed with the loading from the gates exerted on the H-piles transferred to the sheetpile, which will provide stability in the soil. A width of 2.5 feet of sheetpile acting on the soil was assumed based on possible pile sizes. The 2.5 foot width is conservative since the reinforced concrete sill would transfer the loading over a greater width at the top of the sheetpile.

The H-pile will be designed to resist bending moments, the sheetpile will be designed to resist bending moments and for embedment length needed for stability

The control structure will be designed for Case I conditions (see page D-2) in addition the greater of the two following loads will be included in the design:

1. Impact loading of 200 #/ft due to drifting debris.
2. Earthquake loading of .1g.

Cases II and III (see page D-2) are not applicable.

Subject: CONESUS LAKE OUTLET

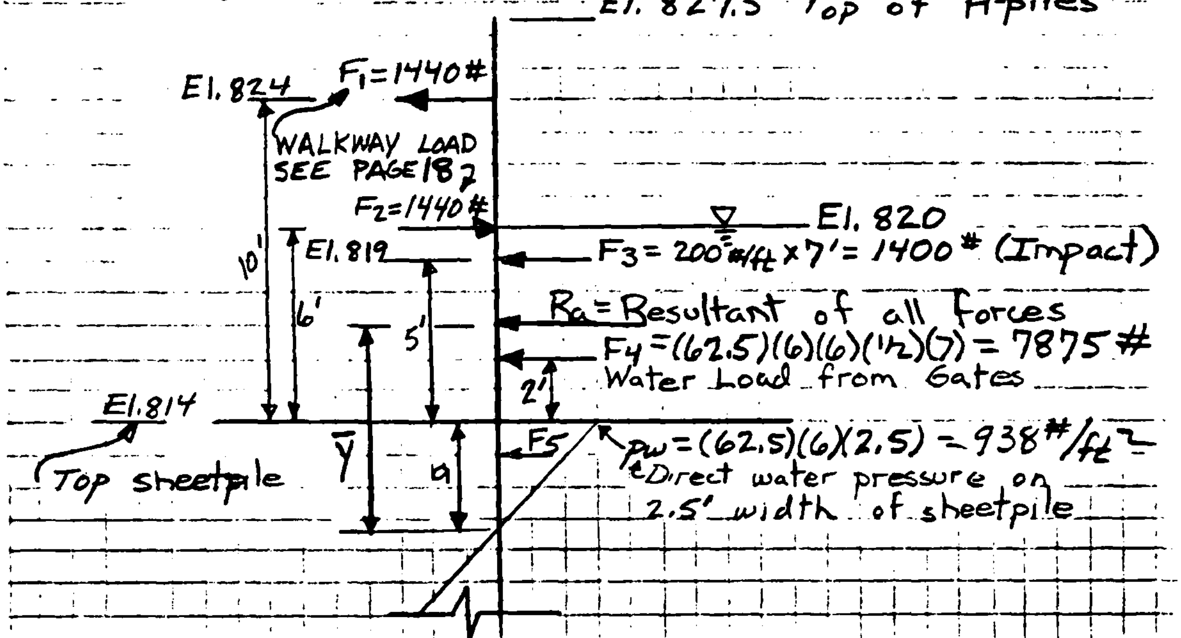
Computation of: SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES

Computed by: FTL   Checked by: AJA   Date: JULY 81

a) LOAD CONDITION – Case I conditions with impact loading (including loads from walkway)

Impact loading = 200 #/ft

Load Diagram – for H-piles + 2.5' width of sheetpile



$C = \gamma'(K_p - K_a)(2.5') = (52.5)(2.17)(2.5) = 285\ \#/ft^2$

$a = \frac{P_w}{C} = \frac{938}{285} = 3.29'$

$F_5 = P_w(a)(1/2) = (938)(3.29)(1/2) = 1543\#$

$R_a = F_1 - F_2 + F_3 + F_4 + F_5$

$R_a = 1440 - 1440 + 1400 + 7875 + 1543 = 10818\#$

Solve for $\bar{y}$

$R_a\bar{y} = (F_1)(10+a) - (F_2)(6+a) + (F_3)(5+a) + (F_4)(2+a) + (F_5)(\tfrac{2}{3}a)$

$10818\,\bar{y} = (1440)(10+3.29) - (1440)(6+3.29) + (1400)(5+3.29) + (7875)(2+3.29) + (1543)(\tfrac{2}{3})(3.29)$

$\bar{y} = 5.77'$

Moment $= R_a\bar{y} = (10818)(5.77) = 62407'\#$

Subject: CONESUS LAKE OUTLET
Computation of: SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by: FTL Checked by: AJA Date: JULY 81

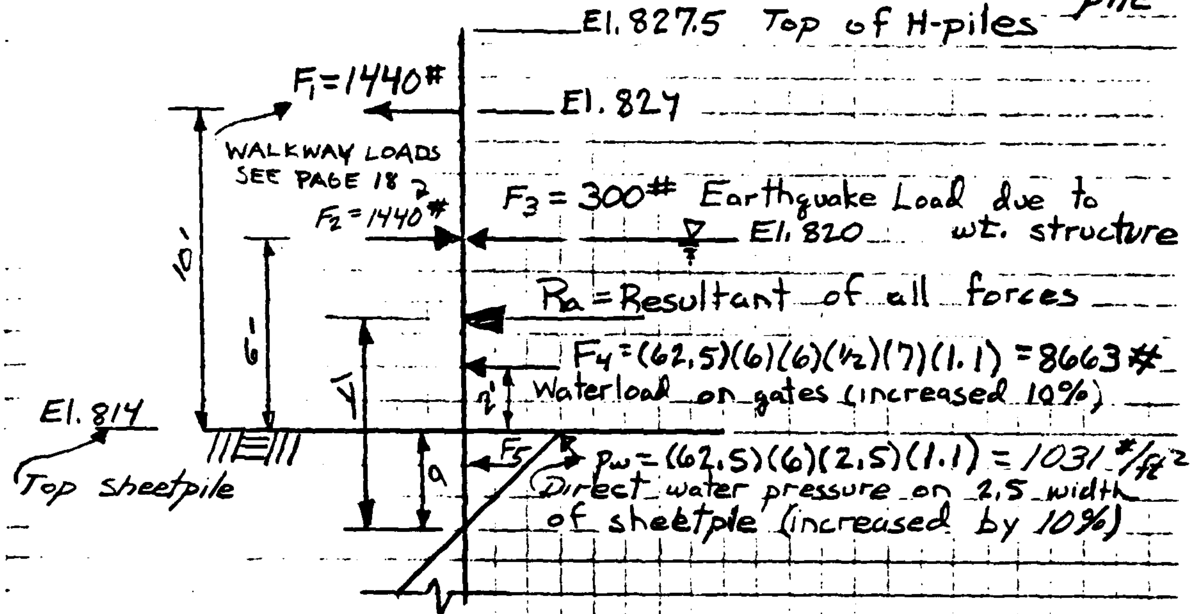
b) LOAD CONDITION – Case I conditions with earthquake loading (including walkway loads)

Weight of control structure above channel bottom is estimated at 3000 # for each 7' section with center of gravity at 6' above channel.

Horizontal earthquake load = 10% of 3000 # = 300 #/7ft

In addition water pressure will be increased by 10% to account for earthquake loading.

Load Diagram – for H-piles + 2.5' width of sheet-pile



$C = \gamma'(k_p - k_a)(2.5') = (52.5)(2.17)(2.5) = 285\ \#/ft^2$
for 2.5' width

$a = \frac{P_w}{C} = \frac{1031}{285} = 3.62'$

$F_5 = = P_w(a)(1/2) = (1031)(3.62)(1/2) = 1866\ \#$

$R_a = F_1 - F_2 + F_3 + F_4 + F_5$
$= 1440 - 1440 + 300 + 8663 + 1866 = 10826\ \#$

Rev. 9/81

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by FTL Checked by AJA Date JULY 81

solve for $\bar{y}$

$R_a(\bar{y}) = (F_1)(10+a) - F_2(6+a) + F_3(6+a) + F_4(2+a) + F_5(\tfrac{2}{3}a)$

$10826\,\bar{y} = (1440)(10+3.62) - (1440)(6+3.62) + (300)(6+3.62) + (8663)(2+3.62) + (1866)(2/3)(3.62)$

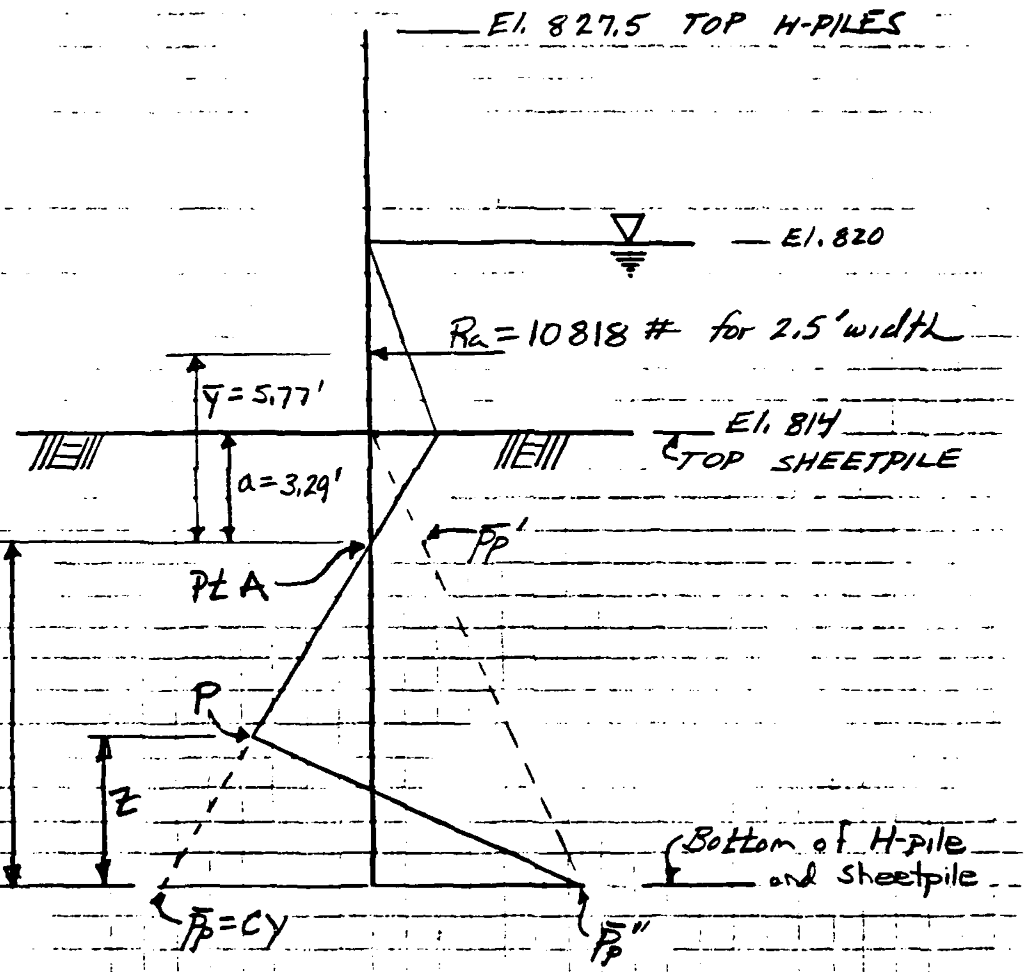
$\bar{y} = 5.71'$

$\text{Moment} = R_a\bar{y} = (10826)(5.71) = 61816\ '^{\#}$

Since load condition in part a (impact load) had the greater moment - 62407'# vs. part b (earthquake loading) moment of 61816'#, the control structure sheetpile and H-pile will be designed using normal loads w/ impact loading shown in part a. Note - these moments are for 2.5' width of sheetpile and are not maximum design moments

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by FTL Checked by AJA Date JULY 81

Using loading diagram of Case I conditions with Impact from part "a", p. 3, showing resultant of loads.



$C = 285\ \#/ft^2$ for 2.5' width

for 1' width, $C = 285/2.5 = 114\ \#/ft^2$

$CY = 114\,Y$

$P_p'' = P_p' + CY$

$P_p' = a\,\gamma'(K_p - K_a) = 3.29(52.5)(2.17) = 375\ \#/ft^2$

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by ETL Checked by ______ Date JULY 81

$\bar{p}_p'' = 375 + CY$

Using Eqn. 13-1 on P.420 of Reference 4 to solve for Y

R_a for 1' width = $10818/2.5 = 4327^{\#}$

$$\text{Eqn 13-1} \rightarrow Y^4 + Y^3\left(\frac{\bar{p}_p}{C}\right) - Y^2\left(\frac{8R_a}{C}\right) - Y\left[\frac{6R_a}{C^2}\left(2\bar{y}C + \bar{p}_p'\right)\right] - \frac{6R_a\bar{y}\bar{p}_p' + 4R_a^2}{C^2} = 0$$

$$Y^4 + \left(\frac{375}{114}\right)Y^3 - \left(\frac{8(4327)}{114}\right)Y^2 - \left[\frac{6(4327)}{114^2}\left(2(5.77)(114) + 375\right)\right]Y - \frac{6(4327)(5.77)(375) + 4(4327)^2}{114^2} = 0$$

$$Y^4 + 3.29Y^3 - 304Y^2 - 3377Y - 10085 = 0$$

$$Y = 20.5'$$

Using Eqn C on P. 420 of Reference 4 to solve for Z

$$\text{eqn C} \rightarrow Z = \frac{\bar{p}_p Y - 2R_a}{\bar{p}_p + \bar{p}_p''}$$

$\bar{p}_p = 114Y = 114(20.5) = 2337\ ^{\#}/ft^2$

$\bar{p}_p'' = 375 + 2337 = 2712\ ^{\#}/ft$

$$Z = \frac{(2337)(20.5) - 2(4327)}{2337 + 2712} = 7.77'$$

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by FTL Checked by ______ Date JULY 81

Solve for pressure P on load diagram

$$\frac{P}{y-z} = \frac{P'}{y} \Rightarrow \frac{P}{20.5-7.77} = \frac{2337}{20.5} \quad P = 1451\ \#/ft^2$$

Determine Point of Zero Shear

$$R_a = \left(\frac{P}{y-z}\right)(x)(x)(1/2)$$

$$4327 = \left(\frac{1451}{20.5-7.77}\right)(x)(x)(1/2)$$

$$x = 8.71'\ \text{below pt A}$$

Maximum Moment

$$+)\ \Sigma M_x = 0$$

$$M_{max} = R_a(\bar{y}+x) - \left(\frac{P}{y-z}\right)(x)(x)(1/2)(x/3)$$

$$= 4327(5.77+8.71) - \left(\frac{1451}{20.5-7.77}\right)(8.71)(8.71)(1/2)\left(\frac{8.71}{3}\right)$$

$$M_{max} = 50111\ \text{ft-\#} \quad \text{for 1 foot width}$$

$$F_y = 38500\ psi \quad F_B = .6F_y = 23100\ psi$$

$$S_{req'd} = \frac{M}{F_B} = \frac{(50111)(12''/')}{23100} = 26\ in^3$$

PZ-32 Provides $S = 38.3\ in^3/ft$ pile

NOTE: In actuality Section Modulus (S) of sheetpile and H-pile would combine together to resist bending moments, however due to light loads and minimum pile sizes required for gate installation, both sheetpile and H-pile will be designed without combining section moduli

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by FTL Checked by ______ Date JULY 81

H-PILE DESIGN

Using Mmax for 2.5' width

$M_{max} = 50111 \times 2.5 = 125278$ ft-#

Maximum Axial Load on H-piles

$2160 + 1440 = 3600\#$ (on end piles see walkway + ramp design, pages 17 and 26)

H-Pile with a minimum flange width of 12" is required, Try HP 12x53, (lightest 12" pile available)

$F_y = 36000$ psi

for HP12X53 $A = 15.5$ in^2

r_x 5.03" (Gates prevent buckling about y-axis)

$K=1$ $\ell \approx 12'$ (axial load transfer to top of sheetpile by bolted connection)

$$\frac{K\ell}{r} = \frac{(1)(12 \times 12)}{5.03} = 28.6$$

From AISC manual p5-74 $F_a = 20.01$ KSI

$$f_a = P/A = \frac{3600}{15.5} = 232 \text{ psi}$$

$f_a/F_a = .232/20.01 = .012 < .15$ use Eqn 1.6-2 AISC

$$\text{Eqn } 1.6\text{-}2 \Rightarrow \frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}$$

for HP12X53 $S_x = 66.8$ in^3

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by EJL Checked by Date JULY 81

$$f_b = \frac{M_{max}}{S} = \frac{125278 \times 12}{66.8} = 22\,500 \text{ psi}$$

$$F_B = .67 F_y = 24000 \text{ PSI}$$

$$\frac{f_a}{F_a} + \frac{f_b}{F_B} = .012 + \frac{22500}{24000} = .95 < 1.0 \text{ OK}$$

HP 12X53 is OK

A total of 8 3/4"ϕ A307 bolts will be used to bolt the H-piles to the sheetpile, the bolts must resist

10818 # in tension and
3600 # in shear
from AISC manual Pages 4-3 + 4-5
for tension, capacity 3/4"ϕ A307 bolt = 8.8 K
$8 \times 8.8K = 70.4 K > 10.8 K$ OK

for shear, capacity 3/4"ϕ A307 bolt = 4.4 K
$8 \times 4.4K = 35.2K > 3.6K$ OK

The steel plate shown on page 1 used to increase effective width of H-pile will carry a maximum of 10818 # in tension

plate size will 2'-6"X3'-0"x 1/2

$F_y = 36$ KSI $F_t = .6F_y = 21.6$ KSI

$A = (2.5 \times 12''/')(1/2) = 15 in^2$

$f_t = \frac{10818}{15} = 721$ psi < 21.6 KSI OK

A total of 6 5/8"ϕ A 307 bolts will be used to bolt plate to sheetpile, bolts resist maximum 10818 # shear
Shear Capacity bolts = 6 X 3.1K/bolt = 18.6K > 10818# OK

SEE PLATE D5 FOR CONNECTION DETAILS (SECTION A-A)

Subject: CONESUS LAKE OUTLET
Computation of: SHEETPILE & H-PILE @ CONTROL STRUCTURE GATES
Computed by: FTL Checked by: Date: JULY 81

Sheetpile and H-pile will be driven to the same depth

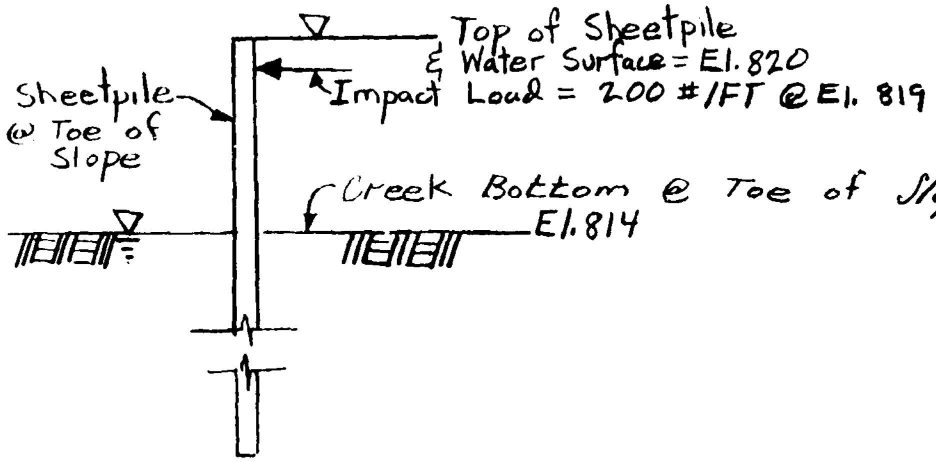
Embedment Length = a+Y
= 3.29 + 20.5 = 23.79

Increase length by 20%

Final Embedment Length = 1.2(23.79)
= 28.5'

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE SIDEWALLS @ CONTROL STRUCTURE
Computed by FTL Checked by ______ Date JUNE 81

Case I conditions with Impact loading,
Cases II and III not applicable.



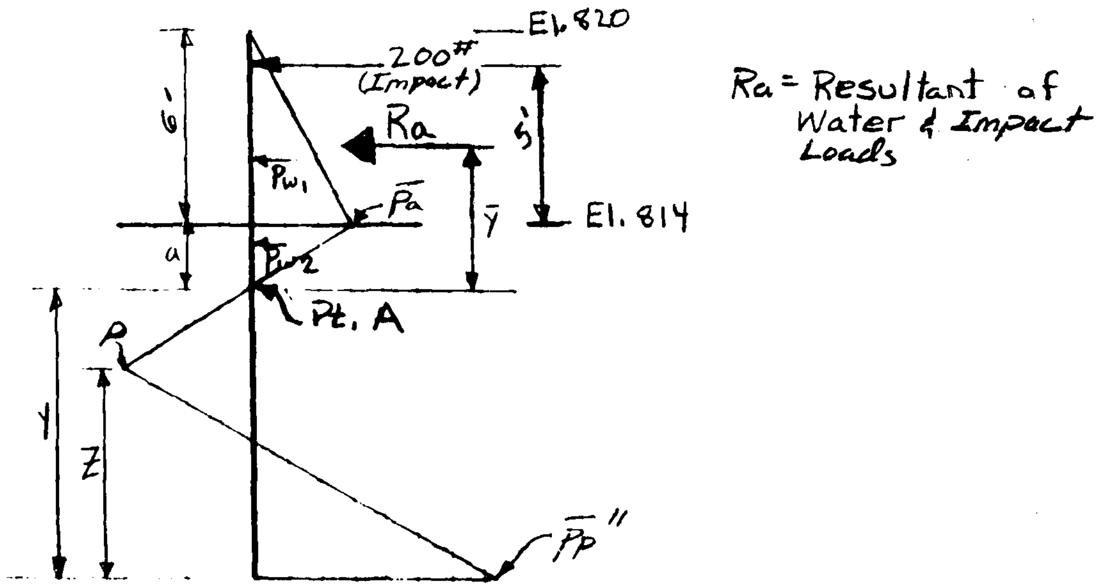
DESIGN DATA

$\gamma_w = 62.5$ #/ft³
$\gamma_{dry} = 110$ #/ft³
$\gamma_{sat} = 115$ #/ft³
$\gamma' = 52.5$ #/ft³

$\phi = 26°$ $K_a = .39$, $K_p = 2.56$
$C = 0$ $K_p - K_a = 2.17$

$F_y = 38500$ PSI
steel sheetpile

LOAD DIAGRAM FOR 1 FOOT OF SHEETPILE



AD-A115 570 CORPS OF ENGINEERS BUFFALO NY BUFFALO DISTRICT F/G 13/2
STAGE III DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STAT--ETC(U)
SEP 81

UNCLASSIFIED NL

5 of 7
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Subject CONESUS LAKE OUTLET
Computation of SHEETPILE SIDEWALLS @ CONTROL STRUCTURE
Computed by ETL Checked by ______ Date JULY 81

$\bar{p}_a = \gamma_w \times 6' = 62.5 \times 6 = 375\ \#/ft^2$

$C = \gamma'(K_p - K_a) = 52.5(2.17) = 114\ \#/ft^2$

$a = \frac{\bar{P}_a}{C} = \frac{375}{114} = 3.29'$

$P_{w1} = \bar{P}_a \times 6 \times 1/2 = (375)(6)(1/2) = 1125\ \#$

$P_{w2} = \bar{p}_a \times a \times 1/2 = (375)(3.29)(1/2) = 617\ \#$

$R_a = 200 + P_{w1} + P_{w2} = 200 + 1125 + 617 = 1942\ \#$

Solving for $\bar{y}$

$R_a \bar{y} = 200(5+a) + P_{w1}(1/3 \times 6 + a) + P_{w2}(2/3 \times a)$

$1942\ \bar{y} = 200(5+3.29) + 1125(2+3.29) + 617(2/3)(3.29)$

$\bar{y} = 4.62'$

Passive minus Active Pressure at Pt. A =

$\bar{P}_p' = a\gamma' K_p - a\gamma' K_a = a\gamma'(K_p - K_a)$

$= (3.29)(52.5)(2.17) = 375\ \#/ft^2$

Using Eqn 13-1 on P. 420 of Reference 4 to solve for Y

Eqn 13-1

$$Y^4 + Y^3(\bar{P}_p'/C) - Y^2\left(\frac{8R_a}{C}\right) - Y\left[\frac{6R_a}{C^2}(2\bar{y}C + \bar{P}_p')\right] - \frac{6R_a \bar{y} \bar{P}_p + 4R_a^2}{C^2} = 0$$

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE SIDEWALLS @ CONTROL STRUCTURE
Computed by FTL Checked by Date JULY 81

Substituting Knowns into Eqn. 13-1

$$y^4 + y^3\left(\frac{375}{114}\right) - y^2\left(\frac{8(1942)}{114}\right) - y\left[\frac{6(1942)}{114^2}\left(2(4.62)(114) + 375\right)\right] - \frac{6(1942)(4.62)(375) + 4(1942)^2}{114^2} = 0$$

$$y^4 + 3.29y^3 - 136y^2 - 1281y - 2714 = 0$$

$$y = 14'$$

Using Eqn c on P420 of Reference 4 to solve for z

Eqn c → $z = \dfrac{\bar{P}_P y - 2R_a}{\bar{P}_P + \bar{P}_P''}$ $\quad \bar{P}_P = cy = (114)(14) = 1596\ \#/ft^2$

$\bar{P}_P'' = \bar{P}_P + \bar{P}_P' = 1596 + 375 = 1971\ \#/ft^2$

$$z = \frac{1596(14) - 2(1942)}{1596 + 1971} = 5.18'$$

Find pressure P

$$\frac{P}{y-z} = \frac{\bar{P}_P}{y} \Rightarrow \frac{P}{14-5.18} = \frac{1596}{14}$$

$$P = 1005\ \#/ft^2$$

Find Point of zero Shear

$$R_a - \left(\frac{P}{y-z}\right)(x)(x)(1/2) = 0$$

$$1942 - \left(\frac{1005}{14-5.18}\right)(x)(x)(1/2) = 0$$

$x = 5.84'$ below pt A

Subject CONESUS LAKE OUTLET
Computation of SHEETPILE SIDEWALLS @ CONTROL STRUCTURE
Computed by ETL Checked by AJA Date JULY 81

Find Max Moment

7) $\Sigma M_x = 0$

$$M_{max} = (R_a)(\bar{y}+x) - \left(\frac{P}{y-z}\right)(x)(x)(1/2)(x/3)$$

$$= (1942)(4.62+5.84) - \left(\frac{1005}{14-5.18}\right)(5.84)(5.84)(1/2)(5.84/3)$$

$M_{max} = 16531$ ft-#

$F_y = 38500$ PSI

$F_B = .6F_y = 23100$ PSI

$$S_{reqd} = \frac{(16531)(12''/')}{23100} = 8.6 \text{ in}^3$$

PZ 32 Provides $S = 38.3$ in^3/ft wall

Total Embedment Length = a + y

3.29 + 14 = 17.29

Increase by 20%

Final Embedment Length = 1.2 × 17.29

= 21'

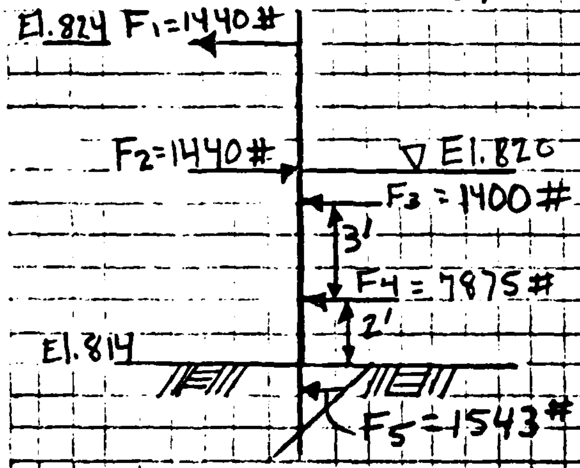
Subject CONESUS LAKE OUTLET
Computation of CHECK OF SSP DESIGN USING "SHTWAL" PROGRAM
Computed by FTL Checked by AJA Date SEPT 81

The computer program "SHTWAL" (capable of the design and analysis of sheetpile walls) in CORPS library was used to check the sheetpile design (required embedment length and maximum moments) on pages 1-15 of the computations. The program was written by William P. Dawkins. The program will not be explained in this report, further information on the program SHTWAL can be found in the User Guide available from the U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg MS

Following are two sets of computer printouts consisting of data input and summary of results on pages 15c,d,e,f for the Sheetpile at the Control Structure Gates (Computations pp 1-11) and pages 15g,h,i,j for the Sheetpile sidewalls (computations 12-15)

1) For the sheetpile supporting the H-piles (computations p. 1-11), the H-pile + sheetpile were inputted in the program as a single structure with the same loading found on p. 3 (impact loading - most severe case) but loads grouped differently as shown —

ACTUAL LOADING (from p. 3)



Resultant of forces $F_1, F_2, F_3, F_4 + F_5$; Ra calculated to be → $R_a = 10818$ #

Subject: CONESUS LAKE OUTLET
Computation of CHECK OF SSP DESIGN USING "SHTWAL" PROGRAM
Computed by FTL Checked by AJA Date SEPT 81

To use SHTWAL program, water load below dredgeline "F5" was dropped, program will calculate water loads from head differential inputed, water load F4 above dredgeline was changed from water load on gates using 7' width (H pile spacing) to a width of 4.5 since it is assumed 2.5' of sheetpile will act on soil (p. 2) → 7 − 2.5 = 4.5, remaining 2.5' of water pressure will be calculated by program automaticly by head differential inputted.

Resultant of loads now equals (Ra)

$F_1 - F_2 + F_3 +$ "modified" F_4

$$\text{mod. } F_4 = 4.5(6)(6)(1/2)(62.5) = 5063\#$$

$$\text{new } R_a = 1440 - 1440 + 1400 + 5063 = 6463\#$$

Distance of Ra above dredgeline $= \bar{y}$

$$R_a(\bar{y}) = F_1(10) - F_2(6) + (F_3)5' + F_4(2')$$

$$6463(\bar{y}) = (1440)(10) - (1440)(6) + (1400)5 + (5063)(2)$$

$\bar{y} = 3.54$ above dredgeline El 814

$$EL.\ R_a = 814 + 3.54 = 817.54$$

Since program analyzes one linear foot of wall and sheetpile is assumed to act on 2.5' of soil, Ra is divided by 2.5'

Ra now equals $6463 \div 2.5 = 2585\#$

Ra is inputted as a Horizontal load acting downstream at El 817.54, top of wall is called El 820.1 since top of water is El 820 upstream + 814 downstream, and walkway, impact and gate loads have been combined as Ra. As previously stated program calculates water pressure from 6' head for width of sheetpile bearing on soil.

2) For sheetpile sidewalls - loading conditions found on p. 12 were inputted into program, no changes were necessary as the other section of sheetpile.

p. 15c

PROGRAM SHTWAL - DESIGN/ANALYSIS OF ANCHORED
OR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS
DATE: 09/02/81 TIME: 08:13:39

1. INPUT DATA

1.A.--HEADING

CONESUS LAKE OUTLET DPR
SHEETPILE AT CONTROL STRUCTURE GATES

1.B.--WALL TYPE, MODE, METHOD
CANTILEVER WALL DESIGN

1.C.--WALL DESCRIPTION
TOP OF WALL ELEVATION = 820.10 (FT)
FACTOR OF SAFETY = 1.00

1.D.--RIGHT SIDE SOIL DESCRIPTION
NUMBER OF RIGHT SIDE SURFACE POINTS = 1
NUMBER OF RIGHT SIDE SOIL LAYERS = 1

RIGHT SIDE SURFACE POINT COORDINATES

POINT NO.	ELEVATION (FT)	X-COORD (FT)
1	814.00	0.00

RIGHT SIDE SOIL LAYER DATA

LAYER NO.	UNIT WEIGHT (PCF)	INTERNAL FRICTION ANGLE (DEG)	COHESION (PSF)	WALL FRICTION ANGLE (DEG)	BOTTOM ELEV AT WALL (FT)	BOTTOM SLOPE (FT/FT)
1	115.00	26.00	0.00	0.00		

1.E.--LEFT SIDE SOIL DESCRIPTION
NUMBER OF LEFT SIDE SURFACE POINTS = 1
NUMBER OF LEFT SIDE SOIL LAYERS = 1

LEFT SIDE SURFACE POINT COORDINATES

POINT NO.	ELEVATION (FT)	X-COORD (FT)
1	814.00	0.00

LEFT SIDE SOIL LAYER DATA

LAYER NO.	UNIT WEIGHT (PCF)	INTERNAL FRICTION ANGLE (DEG)	COHESION (PSF)	WALL FRICTION ANGLE (DEG)	BOTTOM ELEV AT WALL (FT)	BOTTOM SLOPE (FT/FT)
1	115.00	26.00	0.00	0.00		

```
1.F.--WATER DATA
     RIGHT SIDE ELEVATION          =  820.00 (FT)
     LEFT SIDE ELEVATION           =  814.00 (FT)
     WATER UNIT WEIGHT             =   62.50 (PCF)
     SEEPAGE GRADIENT              =    0.00 (FT/FT)


1.G.--SURCHARGE LOADS
     NUMBER OF LINE LOADS             =  0
     DISTRIBUTED LOAD DISTRIBUTION = NONE


1.H.--HORIZONTAL LOADS
     NUMBER OF HORIZONTAL LINE LOADS          =    1
     NUMBER OF HORIZONTAL PRESSURE POINTS     =    0
     EARTHQUAKE ACCELERATION                  =    0.00 (G'S)


     HORIZONTAL LINE LOADS ON WALL
      LOAD       ELEVATION        LOAD
       NO.         (FT)           (PLF)
        1         817.54        2585.00




    DO YOU WANT INPUT DATA SAVED IN A FILE? ENTER 'YES' OR 'NO'
I>NO
    DO YOU WANT A PLOT OF INPUT GEOMETRY?
    ENTER 'YES' OR 'NO'
I>NO
    INPUT SEQUENCE COMPLETE.
    DO YOU WANT TO CONTINUE SOLUTION?
    ENTER 'YES' OR 'NO'
I>YES


    DO YOU WANT ACTIVE AND PASSIVE SOIL PRESSURES
    PRINTED AT YOUR TERMINAL?  ENTER 'YES' OR 'NO'
I>NO
    SOLUTION COMPLETE
    DO YOU WANT RESULTS PRINTED AT YOUR TERMINAL,
    WRITTEN TO A FILE, OR BOTH?
    ENTER 'TERMINAL', 'FILE', OR 'BOTH'
I>TERMINAL
```

P. 15e

```
PROGRAM SHTWAL - DESIGN/ANALYSIS OF ANCHORED
OR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS
DATE: 09/02/81                          TIME: 08:16:21

2. RESULTS

2.A.--HEADING

CONESUS LAKE OUTLET  DPR
SHEETPILE AT CONTROL STRUCTURE  GATES

2.B.--SUMMARY OF RESULTS FOR CANTILEVER WALL DESIGN

      SOIL PRESSURES DETERMINED BY COULOMB
      COEFFICIENTS AND THEORY OF ELASTICITY
      EQUATIONS FOR SURCHARGE LOADS

      WALL BOTTOM:
           PENETRATION =     23.71 (FT)
           ELEVATION   =    790.29 (FT)

      BENDING MOMENT:
           MAXIMUM     =   -51202. (LB-FT)
           ELEVATION   =     801.9 (FT)

      SCALED DEFLECTION:
           MAXIMUM     =  2.24E+10 (LB-IN3)
           ELEVATION   =     820.1 (FT)

           (NOTE: DIVIDE SCALED DEFLECTION BY MODULUS
           OF ELASTICITY IN PSI TIMES PILE MOMENT OF
           INERTIA IN IN**4 TO OBTAIN DEFLECTION IN INCHES)

DO YOU WANT COMPLETE RESULTS OUTPUT?
ENTER 'YES' OR 'NO'
I>YES
```

p. 15f

2.C.--COMPLETE RESULTS FOR CANTILEVER WALL DESIGN

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN3)	NET PRESSURE (PSF)
820.10	-0.	0.	2.24E+10	0.00
819.10	-9.	-28.	2.11E+10	56.25
818.10	-76.	-116.	1.98E+10	118.75
817.54	-161.	-192.	1.90E+10	153.75
817.54	-161.	-2777.	1.90E+10	153.75
817.10	-1399.	-2851.	1.84E+10	181.25
816.10	-4351.	-3063.	1.71E+10	243.75
815.10	-7546.	-3338.	1.58E+10	306.25
814.10	-11048.	-3676.	1.45E+10	368.75
813.10	-14909.	-4048.	1.32E+10	375.00
812.10	-19108.	-4314.	1.19E+10	158.48
810.71	-25210.	-4424.	1.02E+10	0.00
810.10	-27901.	-4403.	9.46E+09	-69.43
809.10	-32251.	-4277.	8.32E+09	-183.39
808.10	-36417.	-4037.	7.23E+09	-297.35
807.10	-40286.	-3682.	6.20E+09	-411.30
806.10	-43743.	-3214.	5.24E+09	-525.26
805.10	-46676.	-2632.	4.36E+09	-639.22
804.10	-48969.	-1935.	3.56E+09	-753.17
803.10	-50508.	-1125.	2.84E+09	-867.13
802.10	-51181.	-201.	2.21E+09	-981.09
801.90	-51202.	0.	2.10E+09	-1004.19
801.10	-50873.	837.	1.67E+09	-1095.04
800.10	-49470.	1989.	1.21E+09	-1209.00
799.10	-46857.	3255.	8.43E+08	-1322.96
798.10	-42922.	4635.	5.55E+08	-1436.92
797.45	-39582.	5598.	4.07E+08	-1511.36
796.45	-33336.	6788.	2.36E+08	-869.97
795.45	-26219.	7338.	1.23E+08	-228.59
795.09	-23594.	7378.	9.38E+07	0.00
793.45	-11942.	6512.	1.90E+07	1054.18
792.45	-6064.	5137.	4.33E+06	1695.57
791.45	-1881.	3121.	3.73E+05	2336.95
790.45	-36.	463.	1.21E+02	2978.34
790.29	-0.	0.	0.	3076.50

(NOTE: DIVIDE SCALED DEFLECTION BY MODULUS OF ELASTICITY IN PSI TIMES PILE MOMENT OF INERTIA IN IN**4 TO OBTAIN DEFLECTION IN INCHES)

p. 159

PROGRAM SHTWAL - DESIGN/ANALYSIS OF ANCHORED
OR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS
DATE: 09/02/81 TIME: 06:02:55

1. INPUT DATA

1.A.--HEADING

CONESUS LAKE OUTLET DPR
SHEETPILE SIDEWALLS AT CONTROL STRUCTURE

1.B.--WALL TYPE, MODE, METHOD
CANTILEVER WALL DESIGN

1.C.--WALL DESCRIPTION
TOP OF WALL ELEVATION = 820.10 (FT)
FACTOR OF SAFETY = 1.00

1.D.--RIGHT SIDE SOIL DESCRIPTION
NUMBER OF RIGHT SIDE SURFACE POINTS = 1
NUMBER OF RIGHT SIDE SOIL LAYERS = 1

RIGHT SIDE SURFACE POINT COORDINATES

POINT NO.	ELEVATION (FT)	X-COORD (FT)
1	814.00	0.00

RIGHT SIDE SOIL LAYER DATA

LAYER NO.	UNIT WEIGHT (PCF)	INTERNAL FRICTION ANGLE (DEG)	COHESION (PSF)	WALL FRICTION ANGLE (DEG)	BOTTOM ELEV AT WALL (FT)	BOTTOM SLOPE (FT/FT)
1	115.00	26.00	0.00	0.00		

1.E.--LEFT SIDE SOIL DESCRIPTION
NUMBER OF LEFT SIDE SURFACE POINTS = 1
NUMBER OF LEFT SIDE SOIL LAYERS = 1

LEFT SIDE SURFACE POINT COORDINATES

POINT NO.	ELEVATION (FT)	X-COORD (FT)
1	814.00	0.00

LEFT SIDE SOIL LAYER DATA

LAYER NO.	UNIT WEIGHT (PCF)	INTERNAL FRICTION ANGLE (DEG)	COHESION (PSF)	WALL FRICTION ANGLE (DEG)	BOTTOM ELEV AT WALL (FT)	BOTTOM SLOPE (FT/FT)
1	115.00	26.00	0.00	0.00		

p.15h

```
1.F.--WATER DATA
     RIGHT SIDE ELEVATION          =  820.00 (FT)
     LEFT SIDE ELEVATION           =  814.00 (FT)
     WATER UNIT WEIGHT             =   62.50 (PCF)
     SEEPAGE GRADIENT              =    0.00 (FT/FT)


1.G.--SURCHARGE LOADS
     NUMBER OF LINE LOADS            =  0
     DISTRIBUTED LOAD DISTRIBUTION = NONE


1.H.--HORIZONTAL LOADS
     NUMBER OF HORIZONTAL LINE LOADS          =    1
     NUMBER OF HORIZONTAL PRESSURE POINTS     =    0
     EARTHQUAKE ACCELERATION                  =    0.00 (G'S)


     HORIZONTAL LINE LOADS ON WALL
      LOAD       ELEVATION        LOAD
       NO.         (FT)           (PLF)
        1         819.00         200.00




    DO YOU WANT INPUT DATA SAVED IN A FILE? ENTER 'YES' OR 'NO'
I>NO
    DO YOU WANT A PLOT OF INPUT GEOMETRY?
    ENTER 'YES' OR 'NO'
I>NO
    INPUT SEQUENCE COMPLETE.
    DO YOU WANT TO CONTINUE SOLUTION?
    ENTER 'YES' OR 'NO'
I>YES
    SOLUTION COMPLETE
    DO YOU WANT RESULTS PRINTED AT YOUR TERMINAL,
    WRITTEN TO A FILE, OR BOTH?
    ENTER 'TERMINAL', 'FILE', OR 'BOTH'
I>TERMINAL
```

p.15 i

```
PROGRAM SHTWAL - DESIGN/ANALYSIS OF ANCHORED
OR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS
DATE: 09/02/81                              TIME: 06:05:17

2. RESULTS

2.A.--HEADING

CONESUS LAKE OUTLET  DPR
SHEETPILE SIDEWALLS AT CONTROL STRUCTURE


2.B.--SUMMARY OF RESULTS FOR CANTILEVER WALL DESIGN


     SOIL PRESSURES DETERMINED BY COULOMB
     COEFFICIENTS AND THEORY OF ELASTICITY
     EQUATIONS FOR SURCHARGE LOADS


     WALL BOTTOM:
          PENETRATION =      17.24 (FT)
          ELEVATION   =     796.76 (FT)

     BENDING MOMENT:
          MAXIMUM     =    -17365. (LB-FT)
          ELEVATION   =      804.7 (FT)

     SCALED DEFLECTION:
          MAXIMUM     =   4.61E+09 (LB-IN3)
          ELEVATION   =      820.1 (FT)


          (NOTE: DIVIDE SCALED DEFLECTION BY MODULUS
          OF ELASTICITY IN PSI TIMES PILE MOMENT OF
          INERTIA IN IN**4 TO OBTAIN DEFLECTION IN INCHES)


 DO YOU WANT COMPLETE RESULTS OUTPUT?
 ENTER 'YES' OR 'NO'
I>YES
```

P. 15 j

2.C.--COMPLETE RESULTS FOR CANTILEVER WALL DESIGN

ELEVATION (FT)	BENDING MOMENT (LB-FT)	SHEAR (LB)	SCALED DEFLECTION (LB-IN3)	NET PRESSURE (PSF)
820.10	0.	0.	4.61E+09	0.00
819.10	-9.	-28.	4.28E+09	56.25
819.10	-9.	-228.	4.28E+09	56.25
818.10	-276.	-316.	3.96E+09	118.75
817.10	-661.	-466.	3.63E+09	181.25
816.10	-1228.	-678.	3.30E+09	243.75
815.10	-2039.	-953.	2.98E+09	306.25
814.10	-3155.	-1291.	2.66E+09	368.75
813.10	-4631.	-1663.	2.35E+09	375.00
812.10	-6445.	-1929.	2.04E+09	158.48
810.71	-9230.	-2039.	1.63E+09	0.00
810.10	-10469.	-2018.	1.46E+09	-69.43
809.10	-12433.	-1892.	1.20E+09	-183.39
808.10	-14214.	-1652.	9.62E+08	-297.35
807.10	-15698.	-1297.	7.45E+08	-411.30
806.10	-16771.	-829.	5.56E+08	-525.26
805.10	-17318.	-247.	3.95E+08	-639.22
804.73	-17365.	0.	3.47E+08	-681.78
804.10	-17226.	450.	2.65E+08	-753.17
803.10	-16381.	1260.	1.64E+08	-867.13
802.10	-14669.	2184.	9.12E+07	-981.09
801.37	-12793.	2935.	5.41E+07	-1064.77
800.37	-9449.	3630.	2.22E+07	-325.48
799.93	-7830.	3702.	1.37E+07	0.00
798.37	-2523.	2803.	1.05E+06	1153.10
797.37	-421.	1280.	2.80E+04	1892.39
796.76	-20.	-0.	0.	2339.52

(NOTE: DIVIDE SCALED DEFLECTION BY MODULUS
OF ELASTICITY IN PSI TIMES PILE MOMENT OF
INERTIA IN IN**4 TO OBTAIN DEFLECTION IN INCHES)

DO YOU WANT GEOMETRY AND/OR RESULTS PLOTTED?
ENTER 'GEOMETRY', 'RESULTS', 'BOTH', OR 'NEITHER'
I>NO

Subject CONESUS LAKE OUTLET
Computation of CHECK OF SSP DESIGN USING "SHTWAL" PROGRAM
Computed by ETL Checked by AJA Date SEPT 81

COMIPARISON OF RESULTS

1) SHEETPILE SUPPORTING H-PILE

	Req'd Embedment (Before 20% Increase)	Max Bending Moment
Hand Computation (a+y)	23.79'	50111 ft-#
SHTWAL Program	23.71'	51202 ft-#

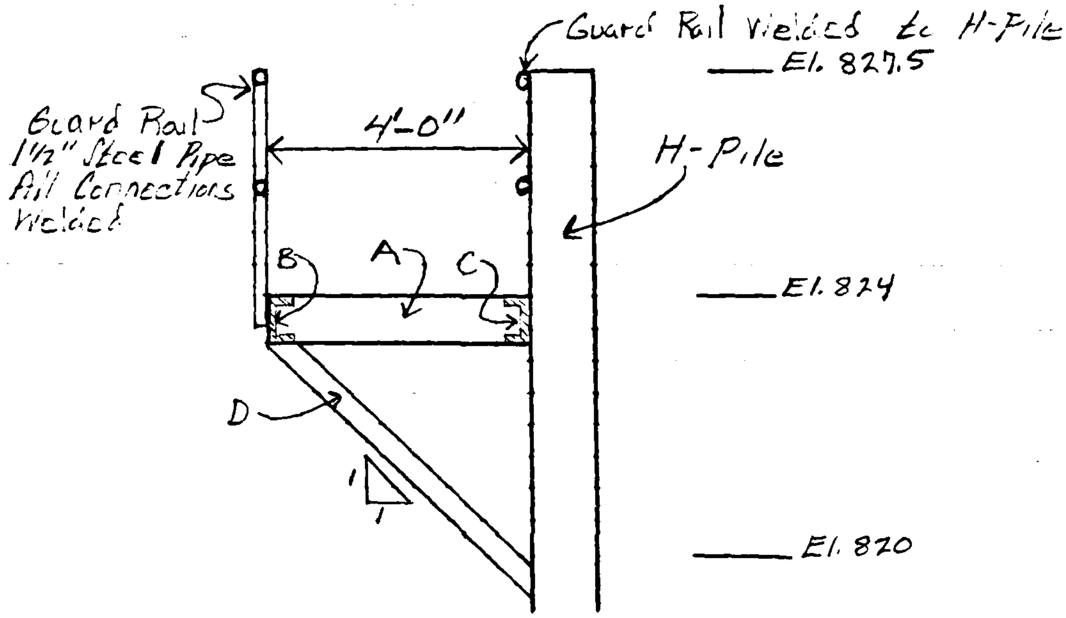
2) SHEETPILE SIDEWALLS

	Req'd Embedment (Before 20% Increase)	Max Bending Moment
Hand Computation (a+y)	17.29'	16531 ft-#
SHTWAL Program	17.24'	17365 ft-#

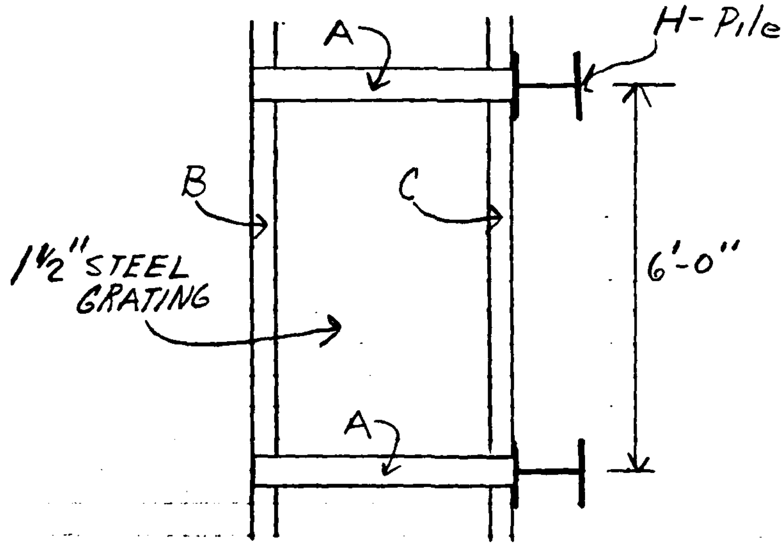
Design Checks Out OK, Pile sizes selected capable of withstanding bending moments listed above.

Deflection difference from top of gates to dredgeline and max. shear were checked for both sections of sheetpile and H-pile and found to be far below critical.

Subject CONESUS LAKE OUTLET
Computation of WALKWAY MEMBER DESIGN
Computed by FTL Checked by AJA Date MARCH 81



ELEVATION



PLAN

Subject: CONESUS LAKE OUTLET
Computation of: WALKWAY MEMBER DESIGN
Computed by: ETL   Checked by: ______   Date: MARCH 81

Use A36 Steel $F_y = 36\,KSI$

Loads $LL = 100$ PSF
$DL = \underline{20}$ PSF
Total = 120 PSF

A) Members B and C (Identical Loading)

$w = 120 \times 2 \quad 240\ plf \ , \quad \ell = 6'$

$M_{Max} = \frac{wl^2}{8} = \frac{(240)(6)^2}{8} = 1080\ '\#$

$F_B = .66(36000) = 23760\ PSI$

$S_{req'd} = \frac{M}{F} = \frac{(1080)(12\ ''/')}{23760} = .55\ in^3$

C6X8.2 Provides S_x of 4.38 in^3

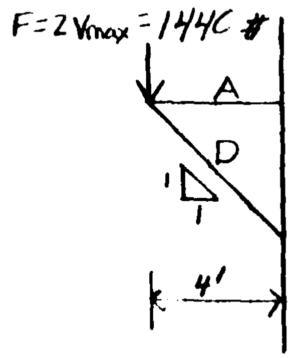
Check Shear

$V_{max} = \frac{wl}{2} = \frac{(240)(6)}{2} = 720\ \#$

$F_v = .4F_y = .4(36000) = 14400\ PSI$

$A_w = 1\,in^2 \quad f_v = \frac{720}{1} = 720 psi < 14400 psi$ OK

B) Members A and D



Load on Member D

$\Sigma F_v = 0 \downarrow +$

$1440 + \frac{1}{\sqrt{2}} F_D = 0$

$F_D = -2036\#$
Compression

Subject: CONESUS LAKE OUTLET
Computation of: WALKWAY MEMBER DESIGN
Computed by: FTL Checked by: ______ Date: MARCH 81

Design of Member D

$K=1 \quad \ell=\sqrt{2}\times 4=5.66'$

Use $3''\times3''\times3/8''$ Angle, $r=.587'$, $A=2.11\ in^2$

$\frac{Kl}{r}=\frac{(1)(5.66\times12)}{.587}=116$

from the AISC manual P 5-84 $F_a=10.85KSI$

$f_a=P/A=2036/2.11=.96KSI<10.85KSI$ OK

Load on Member A

$1440\#$, F_A, $-2036\#$

$\overset{+}{\rightarrow}\Sigma F_H=0 \quad F_H+\frac{1}{\sqrt{2}}(-2036)=0$

$F=1440\#$ TENSION

Design Member A

$F_t=.6(36000)=21600\ psi$

$A_{req'd}=P/F_t=1440/21600=.07\ in^2$

Considering Bending on Member A

$w=(120)(6)=720plf \quad \ell=4'$

$M_{max}=wl^2/8=(720)(4^2)/8=1440'\#$

$S_{req'd}=M/F_B=\frac{1440(12''/')}{23760}=.73\ in^3$

W8X10 provides $S_x=7.81\ in^3$, $A=2.96in^2$

Checking Shear

$V=wl/2=(720)(4)/2=1440\#$ $\quad F_v=.4f_y=.4(36000)=14400psi$

A_w W8X10 $=1.34in^2$ $\quad f_v=\frac{V}{A_w}=\frac{1440}{1.34}=1075psi<14400psi$

OK

Subject CONESUS LAKE OUTLET
Computation of CONNECTION DESIGN OF WALKWAY MEMBERS
Computed by FTL Checked by ______ Date MARCH 81

1) Connection for Member D - 3"x3"x3/8" Angle

Member D carries 1440 # of shear

A 3/16" weld with E70XX electrodes will be used, the weld will be all around the angle

Fv for the weld equals lesser of the following

.3 (nominal tensile strength weld mat'l) = .3(70) = 21 KSI

or

.4 (Fy base metal) = .4 (36) = 14.4 KSI

Use Fv = 14.4 KSI

Shear Capacity Weld = Fv (Effective Throat)(Effective Length)

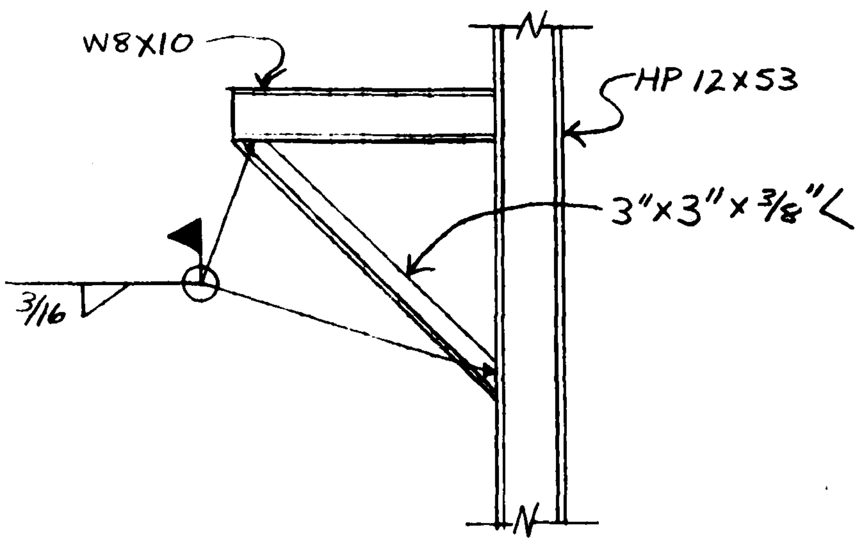
Effective Throat = .707(.1875) = .133"

Effective Length = 2(3) + 2(4.2) = 14.4"

Shear Capacity Weld = (14.4)(.133)(14.4) = 28 K > 1.44 K

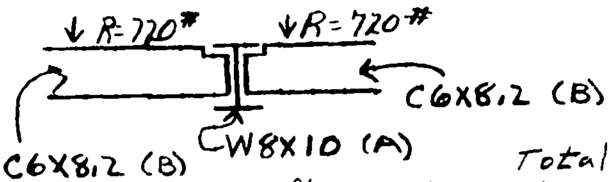
OK

Connection Details for Member D



Subject CONESUS LAKE OUTLET
Computation of CONNECTION DESIGN OF WALKWAY MEMBER
Computed by ETL Checked by ______ Date MARCH 81

2) Connection for Member B into Member A



W8X10 t_w=.17"
C6X8.2 t_w=.20"
ASTM A36(F_y=36 KSI
F_u=58 KSI)

Total Load = 2(720) = 1440#
Top flange C6X8.2 coped 3/4" deep.

From Table II-A, P4-25 of the AISC manual an angle with a length of 2½" and a thickness of 1/4" with 3/4"φ A325 N bolts provides an allowable load capacity of 18.55 Kips
(All Tables referred to are from the AISC manual, Section 4)

Check Bearing Capacity

For Members
from Table I-E p4-6 for a 1" thick material, F_u=58 KSI and a edge distance of 1¼" (from ℄ bolt)
Allowable Bearing Load = 36.3K

for C6X8.2 t_w=.2 1 Bolt
Bearing Capacity = (1)(.2)(36.3) = 7.3K > .72K OK

for W8X10 t_w=.17 2 Bolts
Bearing Capacity = (2)(.17)(36.3) = 12.3K > 1.44K OK

for Angles t=.25
with W8X10 2 bolts 2 angles
B.C. = (36.3)(.25)(2)(2) = 18.15K > 1.44K OK
with C6X8.2 1 bolt, 1 angle
B.C. = (36.3)(.25)(1)(1) = 9.1K > .72K OK

Finding Horizontal End (of C6X8.2 & W8X10) Distance to ℄ Bolt (Minimum req'd)

From Table I-F
For 1" edge distance and F_u=58 KSI allowable load for one fastener = 29.0K

for C6X8 t_w=.2 1 bolt
Min Edge Distance = $\frac{.72}{29 \times .2 \times 1}$ = .13" use 1¼"

Subject: CONESUS LAKE OUTLET
Computation of: CONNECTION DESIGN OF WALKWAY MEMBERS
Computed by: FTL Checked by: Date: MARCH 81

for W8X10 $t_w = .17$ 2 bolts
Min Edge Distance $= \frac{1.44}{29 \times .17 \times 2}$ use $1\frac{1}{4}$"

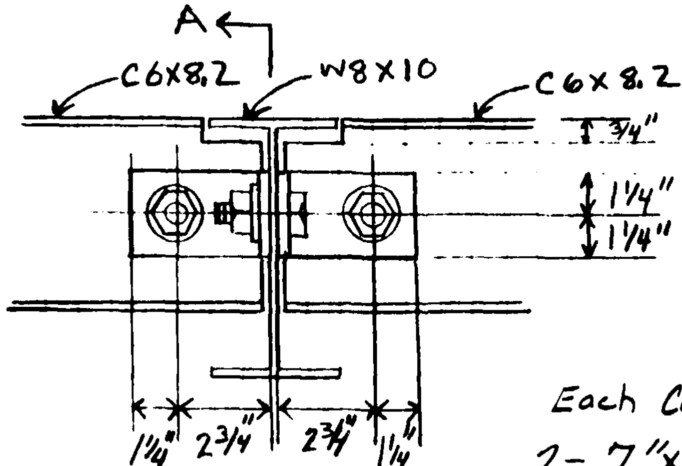
Since C6X8.2 Channel is coped, web tear-out must be checked

From Table I-G, using $\ell_v = 1\frac{1}{4}$" & $\ell_h = 1\frac{1}{4}$" gives $C_1 = 1.00$, $C_2 = 0$ (1 bolt) for 3/4" bolts

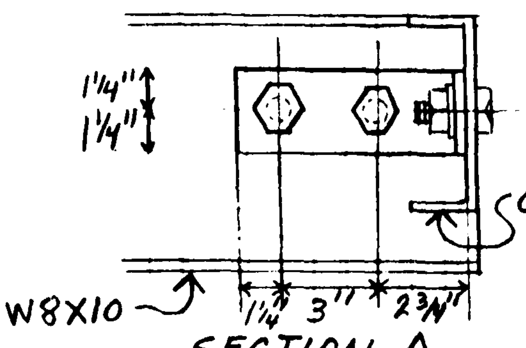
Resistance to web tear-out $= (C_1 + C_2)(F_u)t$

$= (1.00 + 0)(58)(.20) = 11.6\,K > .72\,K$ ok

DETAIL OF CONNECTION
(Allowing for Insertion & Tightening Clearances from P4-132 of the AISC Manual)



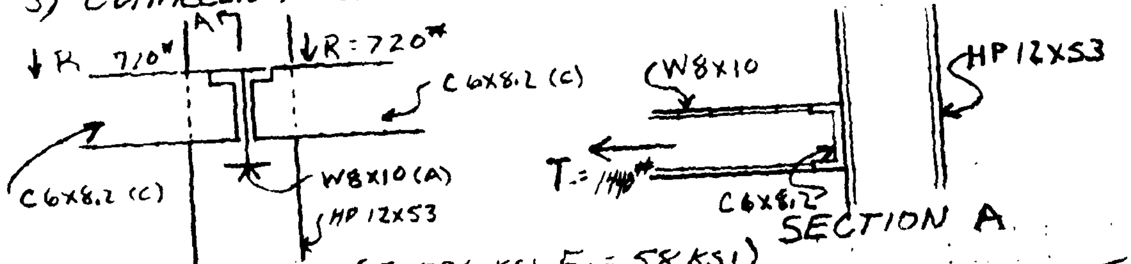
Each Connection Consists of 2- 7"x4"x3/8"x0'-2 1/2" ∠ and 4 A-325N Bolts



SECTION A

Subject: CONESUS LAKE OUTLET
Computation of: CONNECTION DESIGN OF WALKWAY MEMBERS Date: MARCH 81
Computed by: FTL Checked by:

3) Connection of Members C & A and H-piles.



ASTM A36 ($F_y = 36$ KSI, $F_u = 58$ KSI)
W8X10 $t_w = .17''$, C6X8.2 $t_w = .20''$, HP 12X53 $t_f = .435$

The same connection as used for connecting members A & B will be used for this connection.

A) Following is a list of items that were not checked:

1. Bearing capacities for the C6X8.2, W8X10 and angles need not be checked since the increased bearing load + the resultant of the shear and tension force is less than twice the loading used in the previous design and the bearing capacity of the members of this connection is more than twice the actual bearing loads of the previous design.
2. Bearing capacity of the HP 12X53 need not be checked since t_f (HP12X53) is greater than t_w (W8X10) for same loads.
3. Shear capacity of bolts through W8X10, C6X8.2 for same reason given in No. 1, same for web tear out of C6X8.2

B) Following is a list of items that must be checked:

1) Tension on Bolts in C6X8.2 & HP 12X53
2) Interaction of shear and tension on Bolts in C6X8.2 & HP 12X53 & Prying action on angles
3) Section of Angles in Tension

Subject: CONESUS LAKE OUTLET
Computation of: CONNECTION DESIGN OF WALKWAY MEMBERS
Computed by: ETL Checked by: Date: MARCH 81

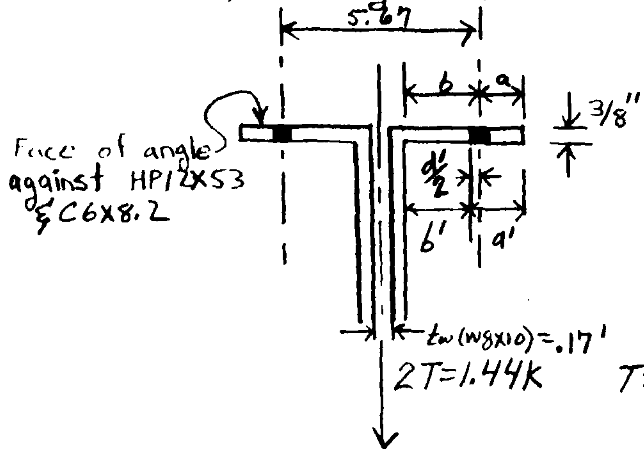
1) Tension on Bolts in C6X8.2 & HP12X53

Number of Bolts = 2
Type of Bolts = 3/4" ϕ A325-N
from Table I-D, p 4-5 AISC manual
Allowable Load in Tension per Bolt = 19.4 K
For 2 bolts → 2 X 19.4 = 38.8 K

Actual Load in Tension = 1.44 K < 38.8 K
OK

2) Interaction of shear and tension on bolts in C 6X8.2 & HP 12X53 & Prying Action on angles
Method and equations of design were taken from pp 4-88 to 4-93 of AISC manual

a) Prying Action



Angles - 7"x4"x3/8"x0'-2 1/2"

1-A325 N Bolt per leg of angle

See Connection Details of Previous Design for Dimensions

T = .72 K

p = length of angle = $2\frac{1}{2}''$ $\qquad d' = 3/4 + 1/16 = 13/16''$

$a = 1\frac{1}{4}''$ $\quad b = 2\frac{3}{4} - 3/8 = 2.375''$ $\qquad d'/2 = \dfrac{3/4 + 1/16}{2} = \dfrac{13}{32}''$

$a' = a + d'/2 = 1\frac{1}{4} + 13/32 = 53/32''$

$b' = b - d'/2 = 2.375 - 13/32 = 1\ 31/32''$

Eq(1) $\quad \delta = 1 - d'/p = 1 - \dfrac{13/16}{2.5} = .675$

Subject CONESUS LAKE OUTLET
Computation of CONNECTION DESIGN OF WALKWAY MEMBERS
Computed by FTL Checked by ____ Date MARCH 81

Eq(2) $M = p t_f^2 F_y/8 = (2.5)(3/8)^2(36)/8 = 1.58$ kip-in

Eq(3) $\alpha = (Tb/M - 1)/\delta$
$= ((.72)(2.375)/1.58 - 1)/(.675) = .122$

Eq(4) $B_c = T\left[1 + \frac{\delta\alpha}{(1+\delta\alpha)}(b'/a')\right]$
$= .72\left[1 + \frac{(.675)(.122)}{(1+(.675)(.122))}\left(1\tfrac{31}{32}/\tfrac{53}{32}\right)\right] = .785$ Kips/bolt

Eq(5) Req'd (angle) $t_f = \left[\frac{8B_c a' b'}{pF_y[a' + \delta\alpha(a'+b')]}\right]^{1/2}$

$= \left[\frac{8(.785)(53/32)(1\tfrac{31}{32})}{(2.5)(36)[53/32 + (.675)(.122)(53/32 + 1\tfrac{31}{32})]}\right]^{1/2}$

$= .118'' < 3/8'' = .375''$ OK

b) Check bolt interaction (shear + tension)

$f_v = V/\#\text{Bolts} \times A_{bolt}$

$V = 1.44K$ # Bolts = 2 $A_{bolt} = .4418\ in^2$

$f_v = 1.44/2 \times .4418 = .318$ KSI

from Table 1.6.3 p 5-28 AISC manual

$F_T = 55 - 1.8 f_v \leq 44$ KSI

$F_T = 55 - 1.8(.318) = 54.4$ KSI
use $F_T = 44$ KSI

$f_t = B_c/A_{bolt} = .785/.4418 = 1.78$ KSI < 44 KSI

OK

Subject CONESUS LAKE OUTLET
Computation of CONNECTION DESIGN ON WALKWAY MEMBERS
Computed by ETL Checked by ______ Date MARCH 81

3) Section of Angles in Tension

Area of angles in tension (2 angles) =

$$(2)(2\tfrac{1}{2})(3/8) - \underbrace{(13/16)(3/8)(2)}_{\text{Area lost to bolt holes}} = 1.26\ in^2$$

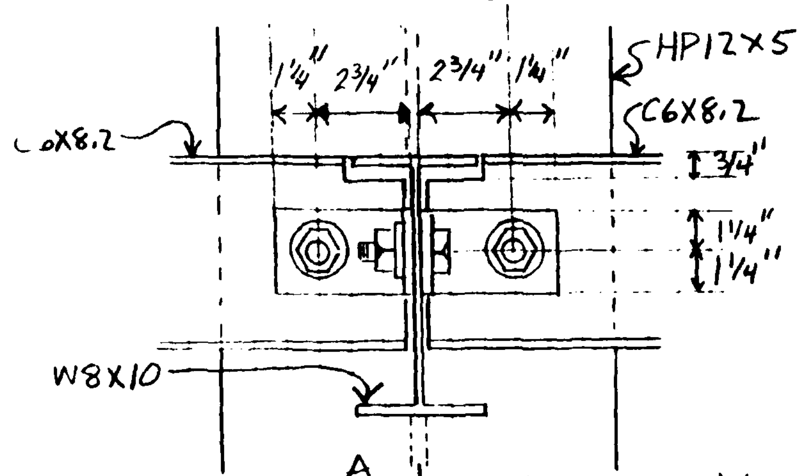
$F_y = 36$ KSI

$F_t = .45 F_y$ (AISC section 1.5.1.1 P5-18)

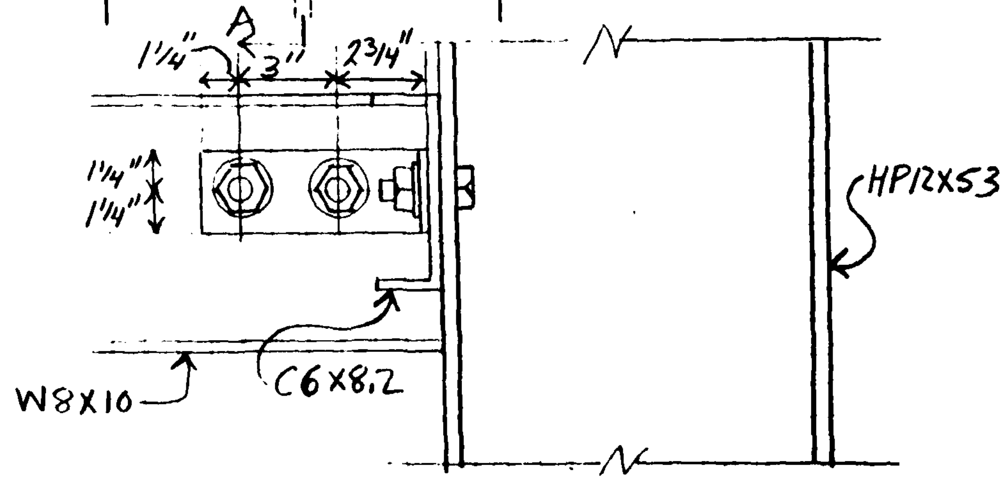
$F_t = .45(36) = 16.2$ KSI

$$f_t = \frac{2T}{A} = \frac{1440}{1.26} = 1.14 \text{ KSI} < 16.2 \text{ KSI}$$

OK

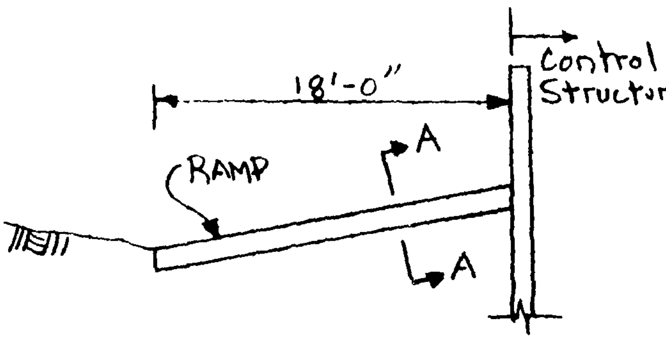


Each Connection Consists of 2-7"x4"x3/8"x0'-2½" Angles and 4 A325N Bolts

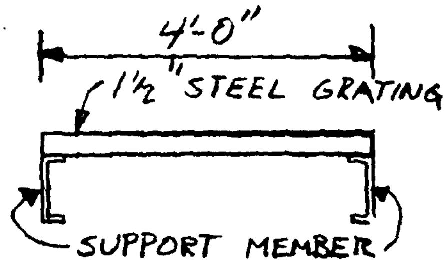


SECTION A

Subject CONESUS LAKE OUTLET
Computation of CONTROL STRUCTURE RAMP
Computed by ETL Checked by Date JUNE 81



ELEVATION



SECTION A-A

DESIGN SUPPORT MEMBER (SIMPLE SUPPORTS)

Use A36 Steel $F_y = 36$ KSI

Loads LL = 100 PSF
DL = 20 PSF

TOTAL = 120 PSF

$w = 120 \times 2' = 240$ plf , $l = 18'$

$M_{max} = \frac{wl^2}{8} = \frac{(240)(18)^2}{8} = 9720$ 'lb

$F_B = .66(36000) = 23760$

$S_{req'd} = \frac{M}{F} = \frac{(9720)(12''/')}{23760} = 4.9 in^3$

C6X10.5 Provides S_x of 5.06 in^3

Check Shear

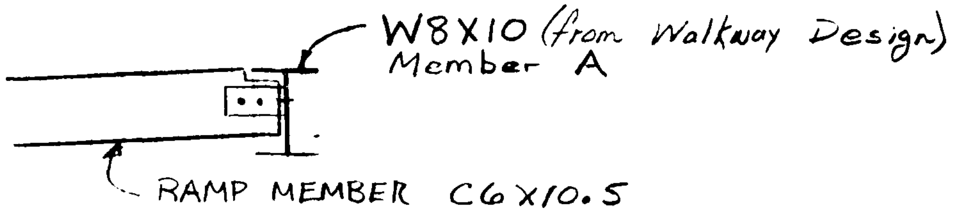
$V_{max} = \frac{wl}{2} = \frac{(240)(18)}{2} = 2160$ lbs.

$F_v = .4F_y = .4(36000) = 14400$ psi

$A_w = 1.8 \ in^2$ $f_v = \frac{2160}{1.8} = 1200 psi < 14400 psi$ OK

Subject: CONESUS LAKE OUTLET
Computation of: CONTROL STRUCTURE RAMP
Computed by: ETL Checked by: Date: JUNE 81

CONNECTION @ CONTROL STRUCTURE



For this connection same bolted connections will be used as used for connecting Member B, C6X8.2 to Member A, W8X10 Since actual loads are less than load capacity of connection see Connection Design of Walkway Members pages 19 through 25

End of Ramp at ground will be bolted down to a 2'x1'x6' block of concrete.

Supporting members of ramp at control structure will be the same as the rest of the walkway, since capacity of these members are greater than loads exerted by ramp, See Walkway Member Design, pages 16 through 18

Subject CONESUS LAKE OUTLET
Computation of PEDESTRIAN BRIDGE
Computed by ETL Checked by AJA H 1-5 Date APRIL 81

A pedestrian bridge will be located at Station 113+20 spanning across the new channel at the Trailer Park to provide access across the new channel

Pre-engineered and fabricated bridges were consided. Following is a list of bridge manufacturers considered -

1. DeBough Manufacturing Company
2. Continental Custom Bridge Company
3. Western Wood Structures, Inc.

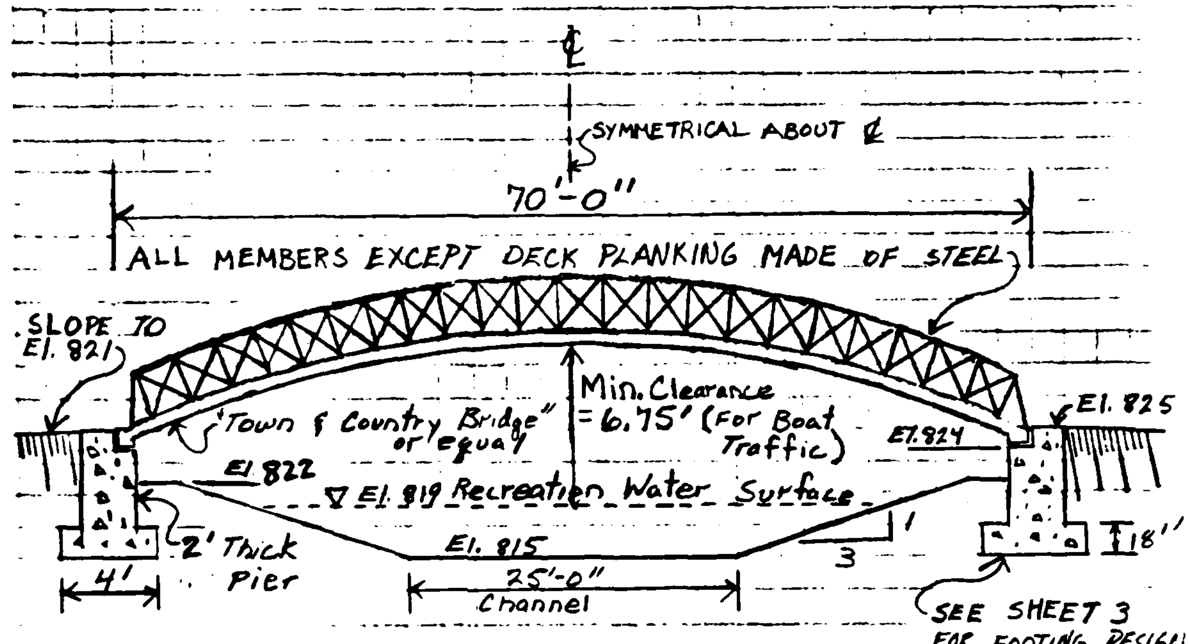
A "Town & Country Bridge" manufactured by DeBough Manufacturing Company or equal will be used.

Specifications of the "Town & Country Bridge" are as follows -

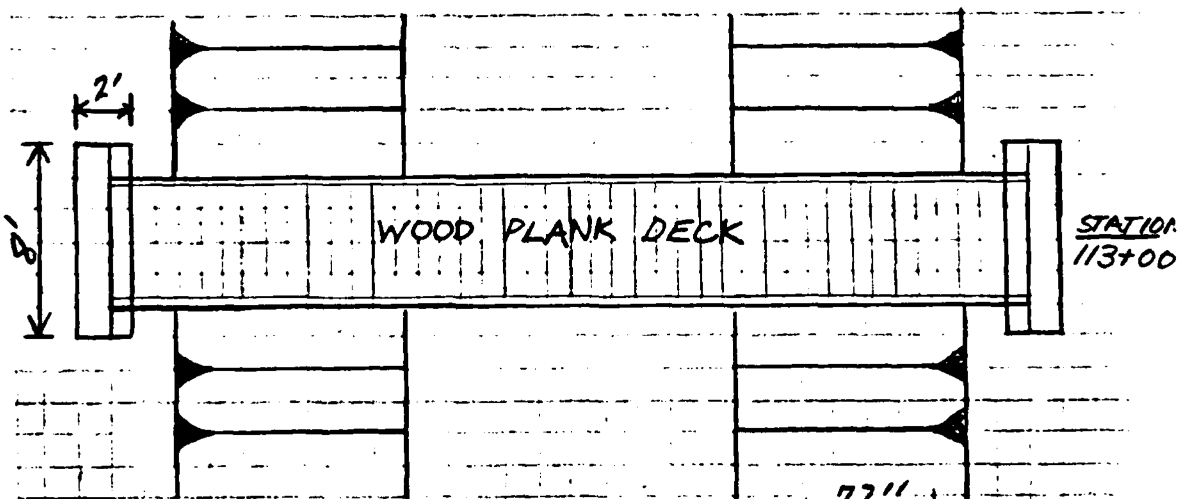
1. Load Capacities
   a) Concentrated Loading - 5000 lbs.
   b) Wind Load - 30 lbs. per square foot
   c) Live Load - 60 lbs. per square foot

2. Materials
   a) All welded steel - high-strength, low-alloy atmospheric corrosion-resistant ASTM A 606 Type 4 steel, 50000 PSI minimum yield
   b) Decking - nominal 2"x10" treated Douglas Fir.

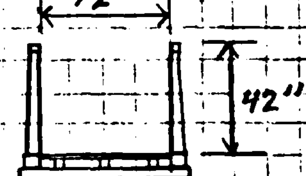
Subject CONESUS LAKE OUTLET
Computation of PEDESTRIAN BRIDGE
Computed by FTL   Checked by AJA   Date APRIL 81



BRIDGE ELEVATION
NOT TO SCALE



PLAN
NOT TO SCALE



TYP. BRIDGE SECTION
NOT TO SCALE

Rev. 9/8
F

Subject CONESUS LAKE OUTLET
Computation of PEDESTRIAN BRIDGE
Computed by FTL Checked by MJA Date APRIL 81

FOOTING DESIGN

Soil Bearing Capacity = 2000 psf

Loads
Dead Load - Bridge Weight = 6900 lbs ÷ 2 = 3450
Concrete (wall) = 2 x 8 x 8.5 x 150 = 20400

Live Load = 60 PSF (Load Bridge Designed for)
70' x 6' x 60 ÷ 2 = 12600 lbs

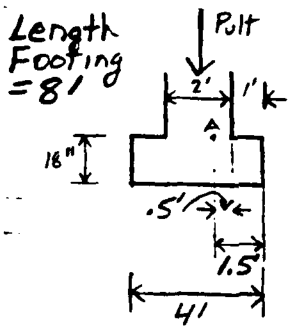
$q_{net} = 2000 - wt_{footing}(PSF) = 2000 - (\frac{18}{12})(150) = 1775$ PSF

Actual Bearing = $\frac{DL+LL}{A} = \frac{3450+20400+12600}{4 \times 8} = 1139$ psf
< 1775 psf OK

Check Required Depth to Resist Moment

$f'_c = 3000$ psi Plain Concrete (No Reinforcement)

Length Footing = 8'



Pult = 1.4DL + 1.7LL = 1.4(3450+20400) + 1.7(12600
= 54818

ultimate $q_{net} = q_{net} \times \frac{P_{ult}}{P}$

$= 1775 \times \frac{54818}{(3450+20400+12600)} = 2670$ psf

Moment is taken at pt. A, 1/4 pt. of wall

$M_u = (1.5)(1.5/2)(8)(2670) = 24030$ 'lb

from ACI 322-79 $f_t = 3.2\sqrt{f'_c} = 175$ psi

$M_u = f_t b h^2/6$

$(24030 \times 12''/') = (175)(8 \times 12''/')(h^2)/6$

min. h reqd = 10.1 inches $< 18''$ (actual)
OK

Subject: CONESUS LAKE OUTLET
Computation of: PEDESTRIAN BRIDGE
Computed by: ETL   Checked by: ______   Date: APRIL 81

NOTE: ALL ALLOWABLE STRESS VALUES TAKEN FROM ACI 322-79 INCLUDE CAPACITY REDUCTION FACTORS (ϕ)

Check Required Depth to Resist shear at Face of Wall

$\bar{V} = P_{ult} = 54818$ lbs.

Req'd $d = \bar{V}/bv$

from ACI 322-79 $v = 1.7\sqrt{f'_c} = 1.7\sqrt{3000} = 93$ psi

$b = 8' \times 12''/' = 96''$

Req'd $d = 54818/(96)(93) = 6.1'' < 18''$ actual
OK

WALL DESIGN

Loads on Wall

DL = 6900 lbs (Wt Bridge)   LL = 12600 lbs (from p. 3)

$P_{ult} = 1.4(6900) + 1.7(12600) = 31080$ lbs.

Checking Bearing

Bridge rests on 2 - 12"x12" plates supplied by the bridge manufacturer

$f_{b\,allowable} = .85\,\phi f'_c = (.85)(.7)(3000) = 1785$ psi

$f_{b\,actual} = 31080 \div (12 \times 12 \times 2) = 108$ psi < 1785 psi OK

Checking Axial Compression

from ACI 322-79

$f_{c\,Allowable} = 0.35 f'_c \left[1 - \left(\frac{\ell_c}{40h}\right)^2\right]$

Subject: CONESUS LAKE OUTLET
Computation of: PEDESTRIAN BRIDGE
Computed by: FTL   Checked by: ____   Date: APRIL 81

$l_c = 8.5'$ $h = 2'$

$$f_{c_{all.}} = 0.35(3000)\left[1 - \left(\frac{8.5}{40(2)}\right)^2\right]$$

$$f_{c_{allowable}} = 1038 \text{ PSI}$$

Bearing Plates will be positioned during detailing so resultant of load falls within middle third of wall.

$$f_{c_{actual}} = P_{ult}/A$$

$$P_{ult} = 31080 + 1.4Wt_{wall} = 31080 + (2' \times 8.5' \times 8' \times 150 \text{ PCF})1.4$$

$$= 59640 \text{ lbs}$$

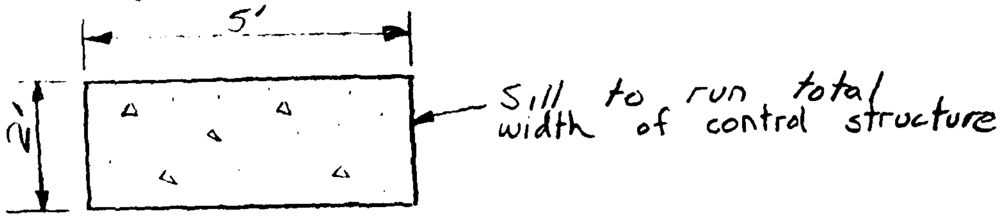
$$f_{c_{actual}} = 59640/8 \times 2 \times 144 = 26 \text{ psi} < 1038 \text{ psi}$$

OK

Total Length of wall was used to compute Area, since width of bearing plus four times wall thickness for both loading points is greater than actual wall length.

Subject CONESUS LAKE OUTLET
Computation of REINFORCEMENT OF CONCRETE SILL
Computed by FTL Checked by Date JUNE 81

Function of concrete sill is to form a watertight closure between embedded sliding gate frame sill and sheetpile. The concrete sill will carry no structural loads as the control structure members were designed without using to concrete sill for support. Therefore reinforcement used shall equal amount needed for temperature and shrinkage reinforcement.



SECTION OF CONCRETE SILL PERPENDICULAR TO CENTERLINE OF CREEK

Grade 40 rebars to be used

for Grade 40 rebars - area of shrinkage and temperature reinforcement to be equal or greater than 0.0020 times gross concrete area. (ACI 318)

a) Section perpendicular to ℄ creek

Area Concrete $= 2' \times 5' = 10\ ft^2$

Area Reinforcement Req'd $= (10 ft^2)(144 \frac{in^2}{1 ft^2})(0.0020) = 2.88\ in^2$

Use 4 - #6 @ .44 in^2/bar $A = 4 \times .44 = 1.76\ in^2$
4 - #5 @ .31 in^2/bar $A = 4 \times .31 = 1.24\ in^2$

Total $= 3\ in^2 > 2.88\ in^2$

b) Section parallel to ℄ creek

Take 1 foot section, depth sill $= 2'$

Area Concrete $= 2' \times 1' = 2\ ft^2$

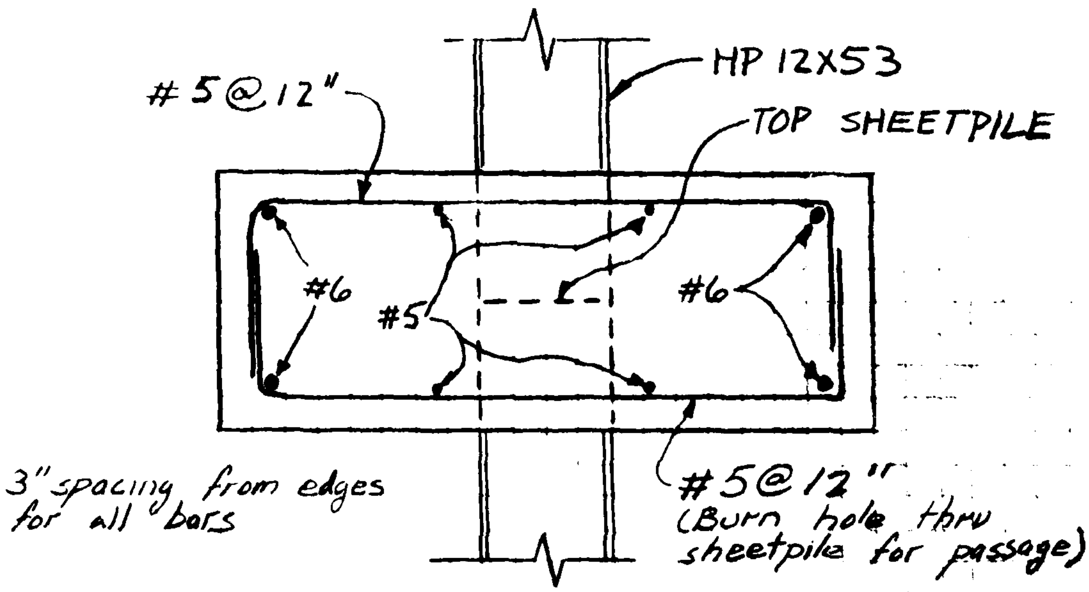
Subject CONESUS LAKE OUTLET
Computation of REINFORCEMENT OF CONCRETE SILL
Computed by FTL Checked by ______ Date JUNE 81

Area Reinforcement Req'd $= (2 ft^2)\left(\frac{144 in^2}{1 ft^2}\right)(0.0020) = .58 in^2$

Use 2-#5 @ .31 in²/bar

$A = 2 \times .31 = .62 in^2 > .58 in^2$

SECTION ⊥ TO ℄ OF CREEK WITH REINFORCEMENT



Project Cost Estimate
March 1981 Price Levels

Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
			$	$
Federal Costs:				
Clearing and Grubbing	15	Acre	2,600.00	39,000
Care of Water		L.S.	4,500.00	4,500
Demolition of Structure		L.S.	2,000.00	2,000
Gravel Access Road	200	L.F.	15.00	3,000
Channel Excavation	48,000	C.Y.	3.90	187,200
Steel Sheet Piling PZ-32	2,480	S.F.	20.00	49,600
H-Piles HP 12 X 53	500	L.F.	21.00	10,500
Structural Steel	5,000	LBS	1.25	6,250
Slide Gates 72" X 72"	11	EA	2,400.00	26,400
24-inch Riprap with 9-inch Bedding	600	S.Y.	33.00	19,800
12-inch Riprap with 6-inch Bedding	1,400	S.Y.	22.00	30,800
1-1/2-inch Steel Floor Grating	460	S.F.	14.00	6,440
1-1/2-inch Pipe Railing	230	L.F.	23.00	5,290
Mitigation Plan		L.S.		64,051
Subtotal-Contractor's Earnings				454,831
Contingencies at 20%±				91,169
Total Contractor's Earnings plus Contingencies				546,000
Engineering and Design				55,000
Supervision and Administration				60,000
Total Federal Cost				661,000

Rev 2/82

Project Cost Estimate (Cont'd)
March 1981 Price Levels

Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
			$	$
Federal Costs (Cont'd)				
Total Contractor's Earnings plus Contingencies				546,000
Engineering and Design $546,000 X 0.10%± = $55,000				55,000
Supervision and Administration S&I: $546,000 X 0.07%± = $38,000				
Overhead: E&D: $55,000 X 0.19%± = 10,000 S&I: $38,000 X 0.32%± = 12,000 $60,000				60,000
				661,000
Non-Federal Costs				
Relocations: Trailers	6	EA	1,700.00	10,200
Trailer Park Electric Line		L.S.	9,000.00	9,000
Trailer Park Sewer Line		L.S.	5,800.00	5,800
Trailer Park Water Line		L.S.	5,000.00	5,000
Pedestrian Bridge		L.S.	21,000.00	21,000
Subtotal				51,000
Contingencies at 20%±				10,000
Engineering and Design at 15%±				8,000
Supervision and Administration at 10%±				5,000
Total Relocations				74,000
Lands and Damages		L.S.	80,000.00	80,000
Total Non-Federal Costs				154,000

Rev 2/82

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX D
SUPPLEMENT S
ADDITIONAL DESIGN DATA

Subject CONESUS LAKE

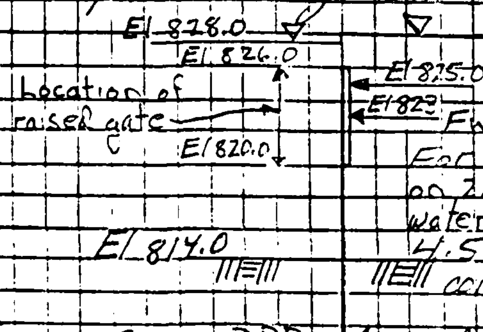
CHECK Computation of SSP Design using SPF + PMF WS Elevations

Computed by ETL Checked by ________ Date DEC 81

From Page A-17 of the Conesus Lake Stage III Final DPR, the Water Surface Elevation at Conesus Lake for –
the Standard Project Flood (SPF) is El. 827.2
the Probable Maximum Flood (PMF) is El. 835.0

A backwater computation ran with a Q = 7200 cfs gave a WS EL at Conesus Lake of 828.4 and a WS EL upstream of Rt 20A of 828.0. The water surface slopes from the lake to Rt 20A with no significant head differential at the control structure resulting in no horizontal loads due to water pressure. But to be conservative a head differential of 0.4 feet will be used with a WSEL of 828.4 upstream and 828.0 downstream. This will be used for the SPF and PME since there is also no head differential and actual WSEL location has no affect on water pressure if head is the same.

OTHER LOADS – Since under the SPF and PMF the control structure is completely submerged, walkway loads (due to personnel traffic) will be dropped. The load most affected is the impact load, since the top of raised gates is El. 826, the impact loading will be raised from El 819 to El 825.



F_I (Impact Loading) = (7)(200) = 1400 lbs
F_W (Water Load) = (4.5)(6)(.4)(62.5) = 675 lbs
For F_W, as stated in DPR sheetpile acts on 2.5' width of soil SHTWAL Program handles water pressure for this width, remaining 4.5' width of water pressure is input in computer as horizontal load

See DPR, Appendix D for other details, soil values, assumptions, etc.

R_a = Resultant of $F_I + F_W$ = 1400 + 675 = 2075 lbs
Location of R_a
$R_a(\bar{y}) = 1400(11) + 675(9)$
$\bar{y} = 10.35$ or $EL = 814 + 10.35 = 824.35$

Subject CONESUS LAKE
CHECK of SSP Design using SPF + PMF WS Elevations
Computed by ETL Checked by ________ Date DEC 81

SHTWAL Program will be used for design as was used in DPR.

Note: Since the gates are raised, there will be an opening from El 814 to El 820. To be conservative and since SHTWAL program can't handle openings, water pressure for this location will be included.

Since program handles 1' width of sheetpile and Ra acts on a 2.5' width, Ra must be divided by 2.5'

Ra now equals $2075/_{2.5} = 830$ lbs acting at El 824.35

Data and Results from the SHTWAL program are attached after this page.

Results show a req'd penetration of 16.47' and a maximum bending moment of 22363 lb-ft.

Penetration in the DPR was 28.5' and maximum bending moment was 50111 lb-ft

CONCLUSION - Control Structure is stable during Standard Project Flood and Probable Maximum Flood

PROGRAM SHTWAL - DESIGN/ANALYSIS OF ANCHORED
OR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS
DATE: 12/16/81 TIME: 04:29:15

1. INPUT DATA

1.A.--HEADING

CONESUS LAKE OUTLET DPR
SHEETPILE AT CONTROL STRUCTURE GATES

1.B.--WALL TYPE, MODE, METHOD
CANTILEVER WALL DESIGN

1.C.--WALL DESCRIPTION
TOP OF WALL ELEVATION = 826.00 (FT)
FACTOR OF SAFETY = 1.50

1.D.--RIGHT SIDE SOIL DESCRIPTION
NUMBER OF RIGHT SIDE SURFACE POINTS = 1
NUMBER OF RIGHT SIDE SOIL LAYERS = 1

RIGHT SIDE SURFACE POINT COORDINATES

POINT NO.	ELEVATION (FT)	X-COORD- (FT)
1	814.00	0.00

RIGHT SIDE SOIL LAYER DATA

LAYER NO.	UNIT WEIGHT (PCF)	INTERNAL FRICTION ANGLE (DEG)	COHESION (PSF)	WALL FRICTION ANGLE (DEG)	BOTTOM ELEV AT WALL (FT)	BOTTOM SLOPE (FT/FT)
1	115.00	26.00	0.00	14.00		

1.E.--LEFT SIDE SOIL DESCRIPTION

NUMBER OF LEFT SIDE SURFACE POINTS = 1
NUMBER OF LEFT SIDE SOIL LAYERS = 1

LEFT SIDE SURFACE POINT COORDINATES

POINT NO.	ELEVATION (FT)	X-COORD (FT)
1	814.00	0.00

LEFT SIDE SOIL LAYER DATA

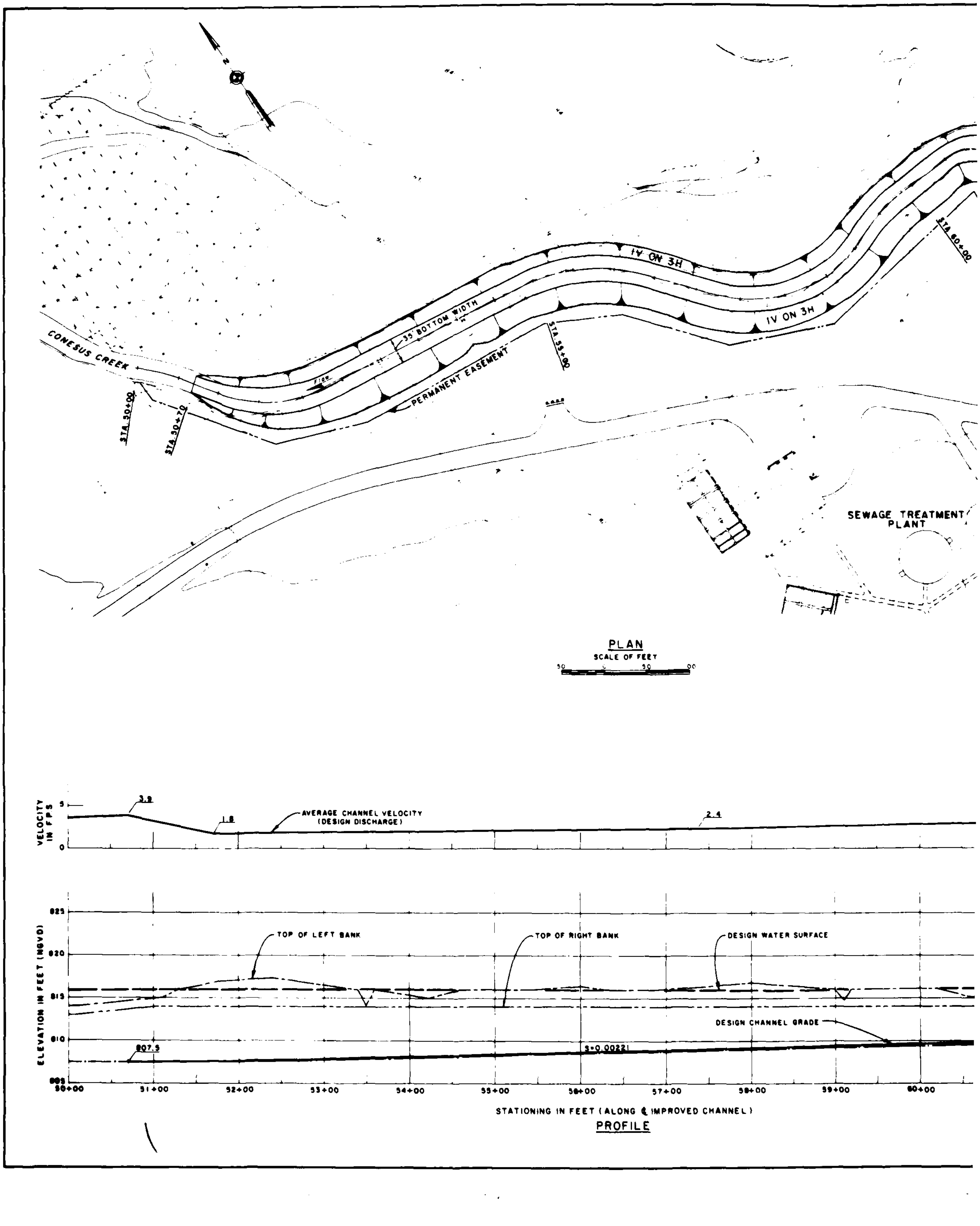
LAYER NO.	UNIT WEIGHT (PCF)	INTERNAL FRICTION ANGLE (DEG)	COHESION (PSF)	WALL FRICTION ANGLE (DEG)	BOTTOM ELEV AT WALL (FT)	BOTTOM SLOPE (FT/FT)
1	115.00	26.00	0.00	14.00		

1.F.--WATER DATA

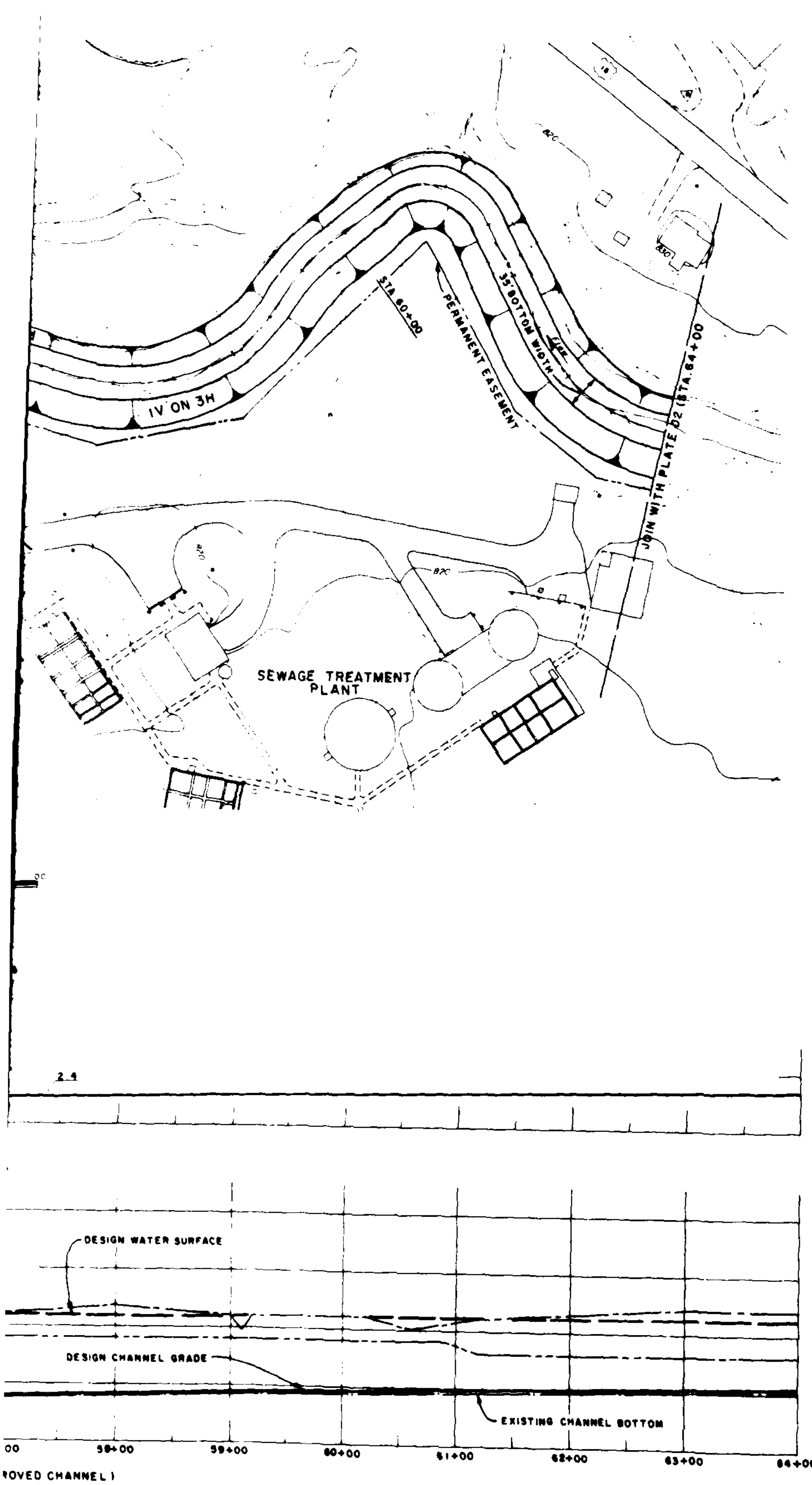
RIGHT SIDE ELEVATION = 828.40 (FT)
LEFT SIDE ELEVATION = 828.00 (FT)
WATER UNIT WEIGHT = 62.50 (PCF)
SEEPAGE GRADIENT = 0.00 (FT/FT)

```
1.G.--SURCHARGE LOADS
     NUMBER OF LINE LOADS            =  0
     DISTRIBUTED LOAD DISTRIBUTION = NONE


1.H.--HORIZONTAL LOADS
     NUMBER OF HORIZONTAL LINE LOADS          =    1
     NUMBER OF HORIZONTAL PRESSURE POINTS     =    0
     EARTHQUAKE ACCELERATION                  =     .10 (G'S)


     HORIZONTAL LINE LOADS ON WALL
      LOAD       ELEVATION        LOAD
       NO.         (FT)           (PLF)
        1         824.35         830.00



    DO YOU WANT INPUT DATA SAVED IN A FILE? ENTER 'YES' OR 'NO'
I>Y
    ENTER FILE NAME IN WHICH INPUT DATA WILL BE SAVED.
     (6 CHARACTERS MAXIMUM)
I>CON1
    DO YOU WANT A PLOT OF INPUT GEOMETRY?
    ENTER 'YES' OR 'NO'
I>N
    INPUT SEQUENCE COMPLETE.
    DO YOU WANT TO CONTINUE SOLUTION?
    ENTER 'YES' OR 'NO'
I>_
```

```
PROGRAM SHTWAL - DESIGN/ANALYSIS OF ANCHORED
OR CANTILEVER SHEET PILE WALLS BY CLASSICAL METHODS
DATE: 12/16/81                             TIME: 06:06:15

2. RESULTS

2.A.--HEADING

CONESUS LAKE OUTLET DPR
SHEETPILE AT CONTROL STRUCTURE GATES


2.B.--SUMMARY OF RESULTS FOR CANTILEVER WALL DESIGN


    SOIL PRESSURES DETERMINED BY COULOMB
    COEFFICIENTS AND THEORY OF ELASTICITY
    EQUATIONS FOR SURCHARGE LOADS


    WALL BOTTOM:
        PENETRATION =     16.47 (FT)
        ELEVATION   =    797.53 (FT)

    BENDING MOMENT:
        MAXIMUM     =   -22363. (LB-FT)
        ELEVATION   =     807.0 (FT)

    SCALED DEFLECTION:
        MAXIMUM     =  9.35E+09 (LB-IN3)
        ELEVATION   =     826.0 (FT)

        (NOTE: DIVIDE SCALED DEFLECTION BY MODULUS
```



CONESUS CREEK
STA 50+00
STA 50+70
35' BOTTOM WIDTH
FLOW
PERMANENT EASEMENT
STA 55+00
IV ON 3H
IV ON 3H
STA 60+00
SEWAGE TREATMENT PLANT
PLAN
SCALE OF FEET
VELOCITY IN FPS
3.9
1.8
AVERAGE CHANNEL VELOCITY (DESIGN DISCHARGE)
2.4
ELEVATION IN FEET (NGVD)
TOP OF LEFT BANK
TOP OF RIGHT BANK
DESIGN WATER SURFACE
DESIGN CHANNEL GRADE
807.5
S=0.00221
50+00
51+00
52+00
53+00
54+00
55+00
56+00
57+00
58+00
59+00
60+00
STATIONING IN FEET (ALONG ℄ IMPROVED CHANNEL)
PROFILE



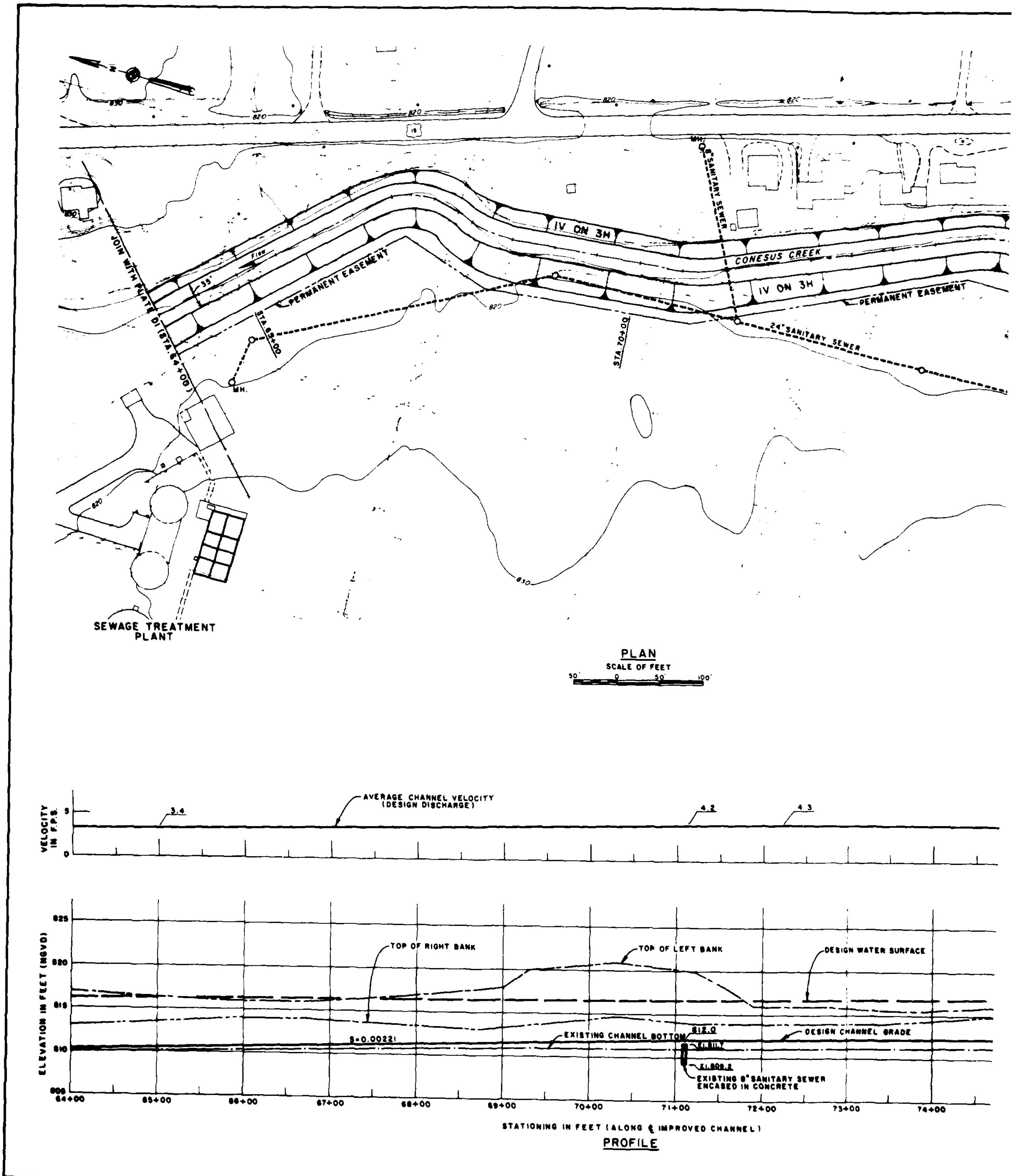
CONESUS LAKE
LIVONIA, NEW YORK

LOCAL FLOOD PROTECTION
SECTION 205

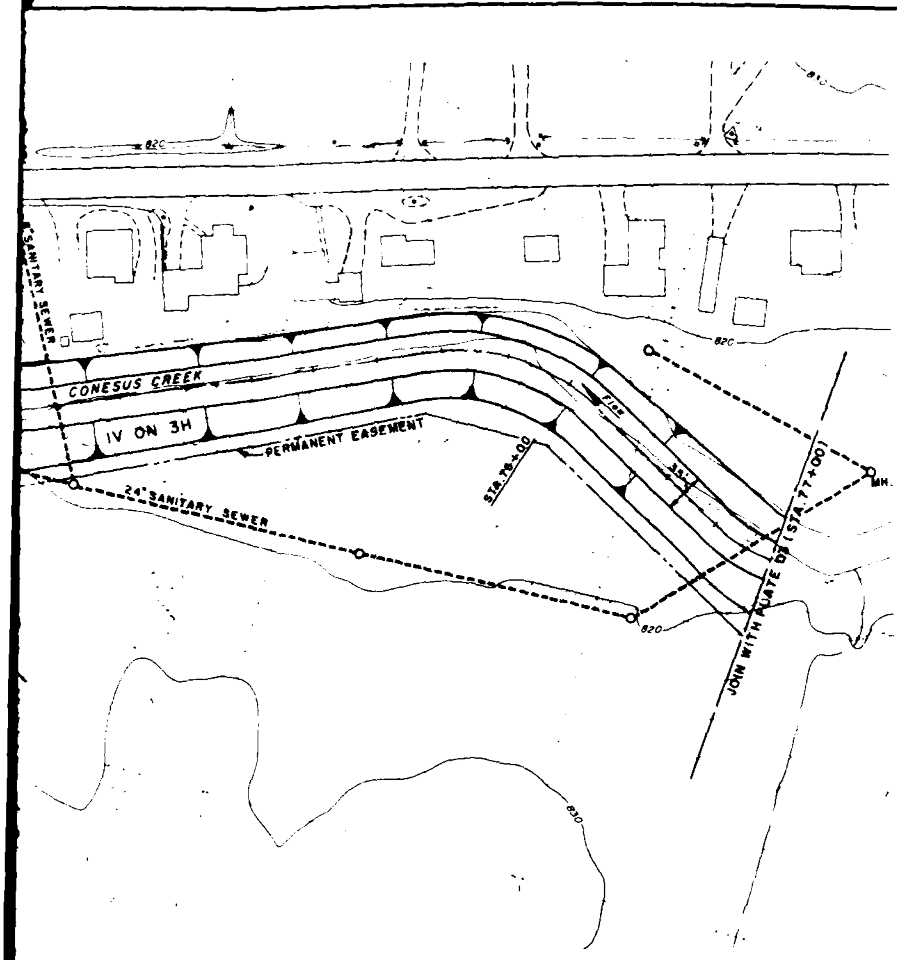
PLAN AND PROFILE
(STA. 51+00 TO STA. 64+00)

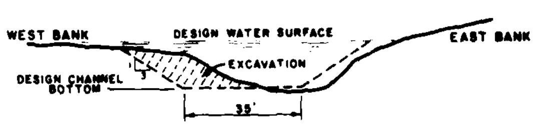
U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE D1

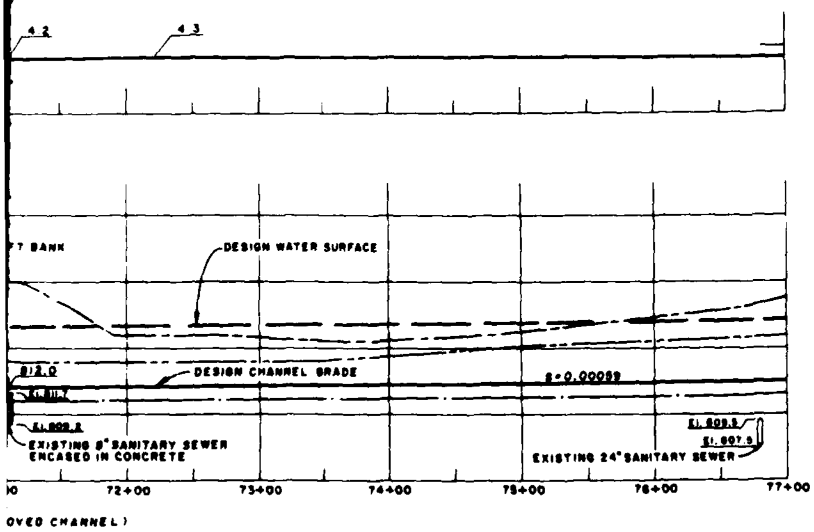


IV ON 3H
CONESUS CREEK
PERMANENT EASEMENT
24" SANITARY SEWER
8" SANITARY SEWER
JOIN WITH PLATE D1 (STA. 64+00)
STA 65+00
STA 70+00
MH.
SEWAGE TREATMENT PLANT
PLAN
SCALE OF FEET
AVERAGE CHANNEL VELOCITY (DESIGN DISCHARGE)
VELOCITY IN F.P.S.
TOP OF RIGHT BANK
TOP OF LEFT BANK
DESIGN WATER SURFACE
EXISTING CHANNEL BOTTOM
DESIGN CHANNEL GRADE
S=0.00221
EXISTING 8" SANITARY SEWER ENCASED IN CONCRETE
ELEVATION IN FEET (NGVD)
STATIONING IN FEET (ALONG ℄ IMPROVED CHANNEL)
PROFILE





TYPICAL CHANNEL SECTION
STA. 52+00 TO 20A
(NOT TO SCALE)



CONESUS LAKE
LIVONIA, NEW YORK

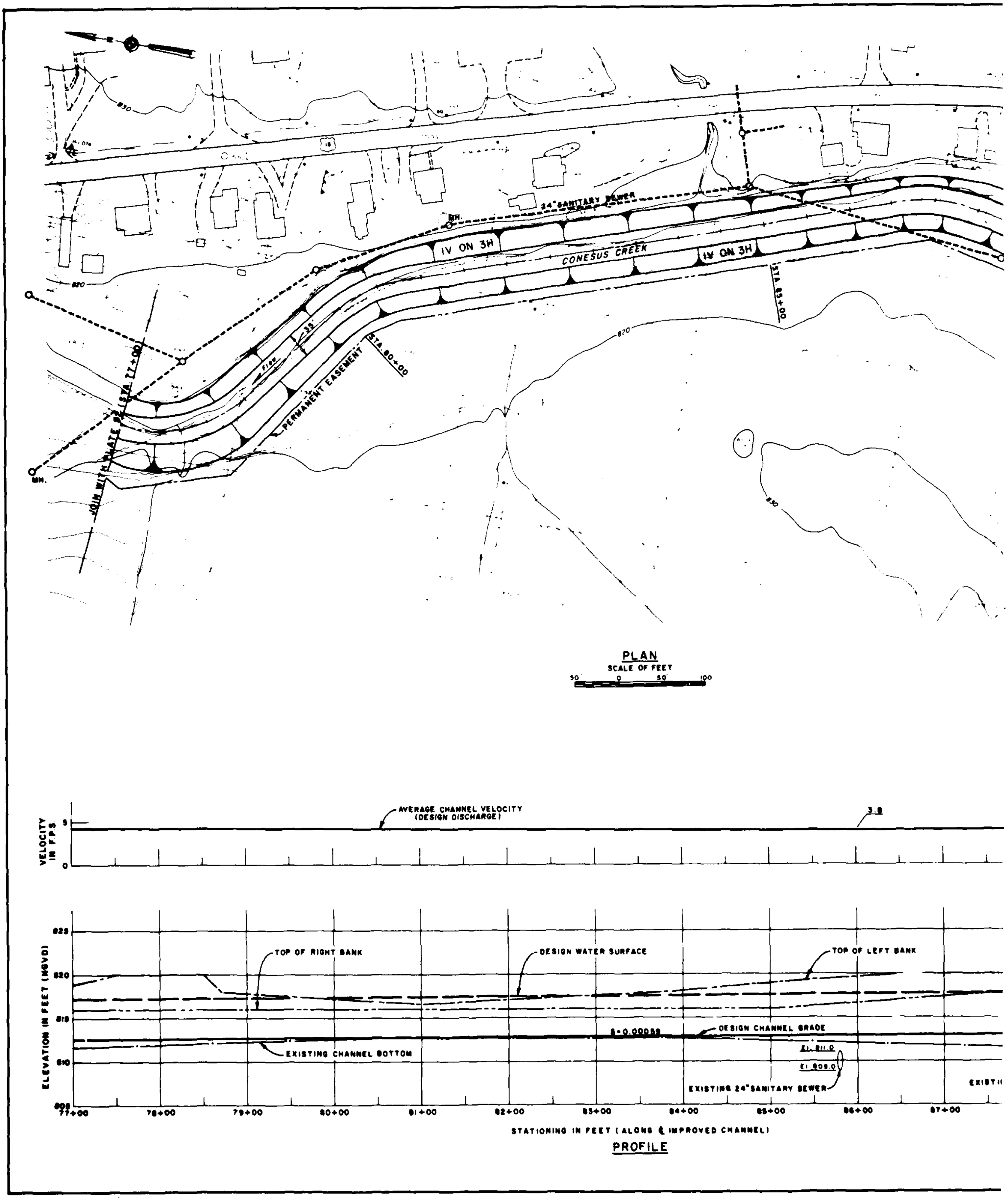
LOCAL FLOOD PROTECTION
SECTION 205

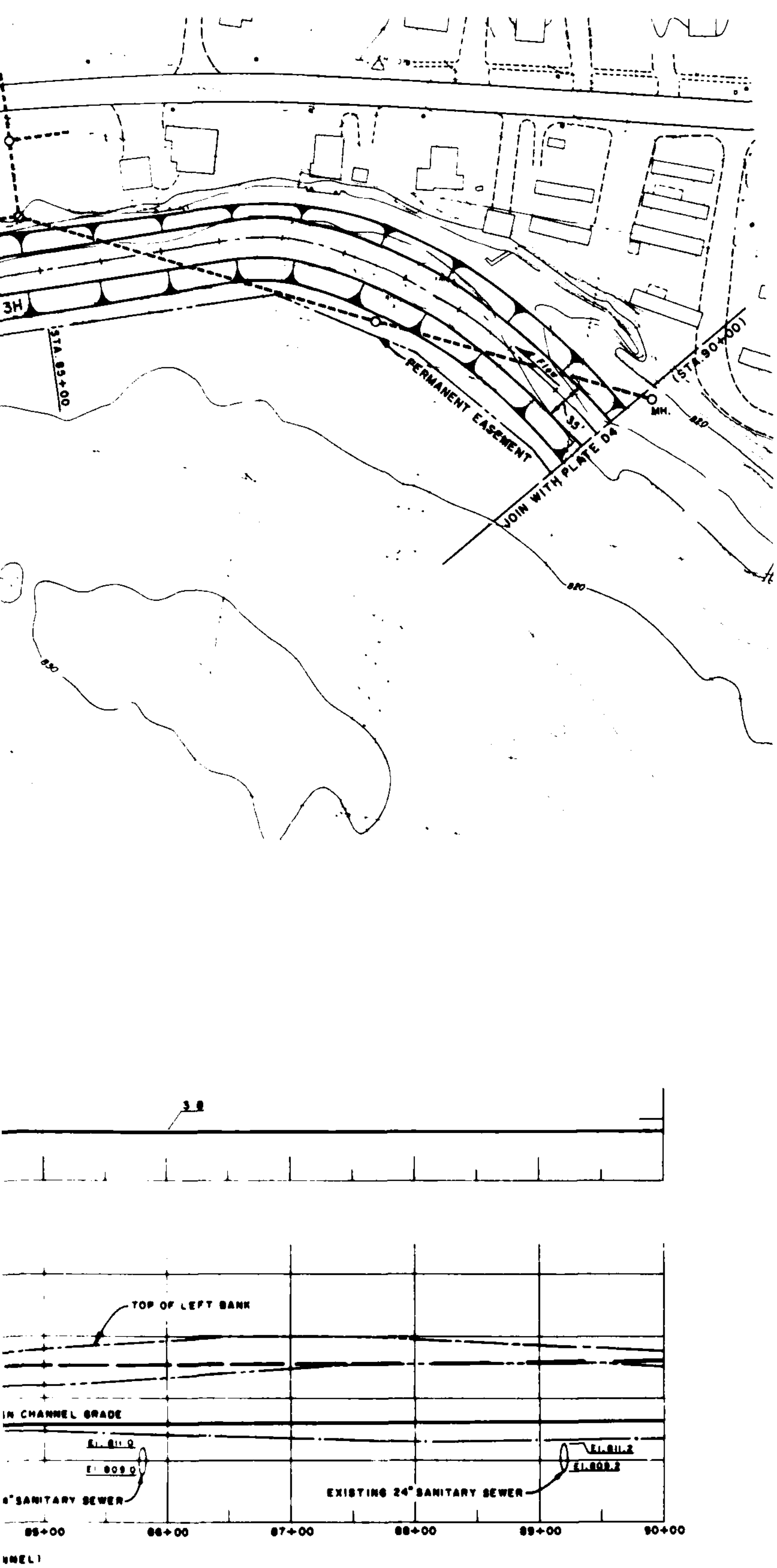
PLAN AND PROFILE

(STA. 64+00 TO STA. 77+00)

U.S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE D2


24" SANITARY SEWER
MH.
1V ON 3H
CONESUS CREEK
1V ON 3H
STA. 85+00
STA. 80+00
PERMANENT EASEMENT
JOIN WITH PLATE (STA. 77+00)
820
830
PLAN
SCALE OF FEET
50 0 50 100
VELOCITY IN F.P.S.
AVERAGE CHANNEL VELOCITY (DESIGN DISCHARGE)
3.8
ELEVATION IN FEET (NGVD)
TOP OF RIGHT BANK
DESIGN WATER SURFACE
TOP OF LEFT BANK
S=0.00059
DESIGN CHANNEL GRADE
EXISTING CHANNEL BOTTOM
El. 811.0
El. 809.0
EXISTING 24" SANITARY SEWER
77+00
78+00
79+00
80+00
81+00
82+00
83+00
84+00
85+00
86+00
87+00
STATIONING IN FEET (ALONG ℄ IMPROVED CHANNEL)
PROFILE



CONESUS LAKE
LIVONIA, NEW YORK

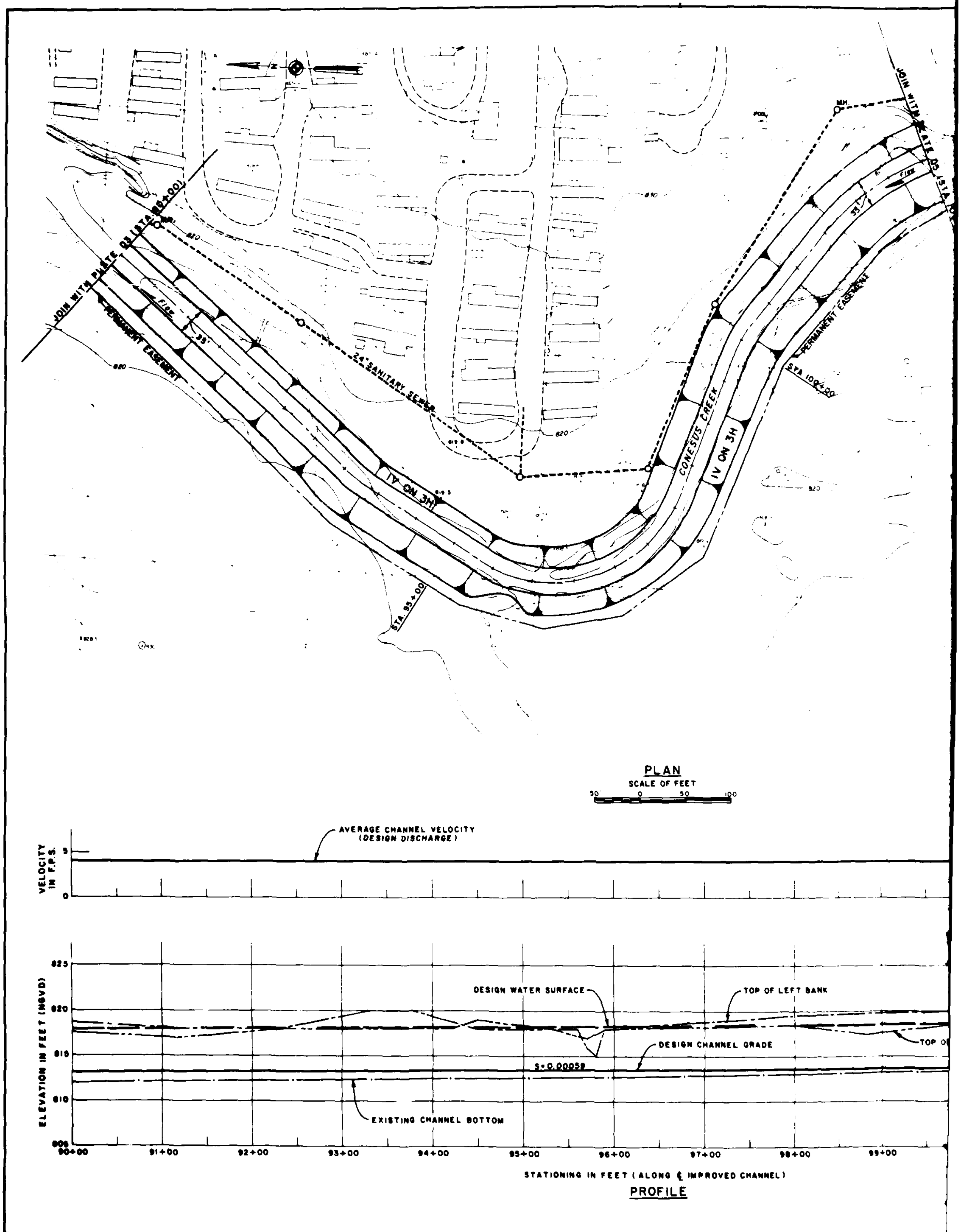
LOCAL FLOOD PROTECTION
SECTION 205

PLAN AND PROFILE

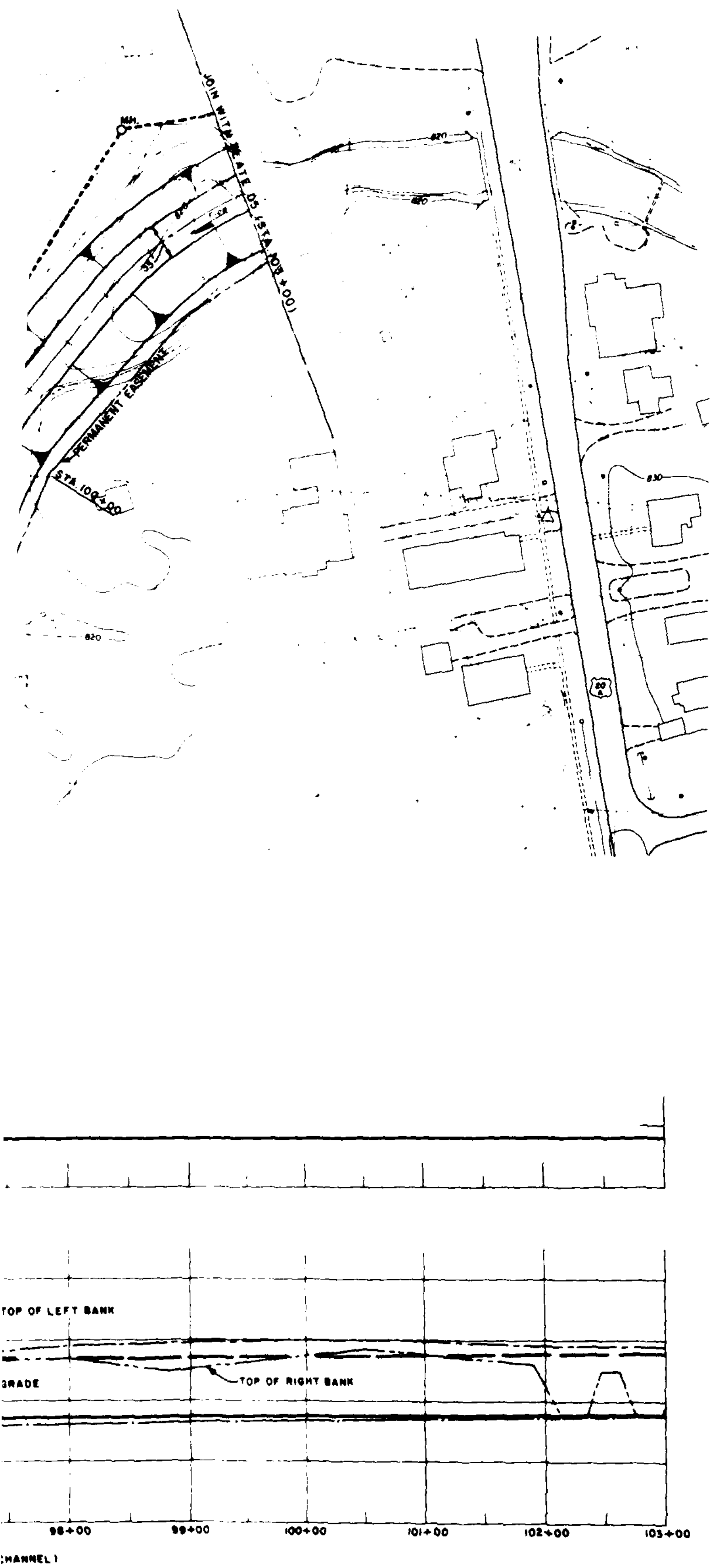
(STA. 77+00 TO STA. 90+00)

U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE D3



JOIN WITH PLATE D3 (STA. 90+00)
JOIN WITH PLATE D5 (STA.
PERMANENT EASEMENT
24" SANITARY SEWER
1V ON 4H
CONESUS CREEK
1V ON 3H
STA. 95+00
STA. 100+00
MH
FLOW
35'
820
PLAN
SCALE OF FEET
50 0 50 100
AVERAGE CHANNEL VELOCITY (DESIGN DISCHARGE)
VELOCITY IN F.P.S.
ELEVATION IN FEET (NGVD)
DESIGN WATER SURFACE
TOP OF LEFT BANK
TOP OF
DESIGN CHANNEL GRADE
S=0.00059
EXISTING CHANNEL BOTTOM
90+00
91+00
92+00
93+00
94+00
95+00
96+00
97+00
98+00
99+00
STATIONING IN FEET (ALONG ℄ IMPROVED CHANNEL)
PROFILE



CONESUS LAKE
LIVONIA, NEW YORK

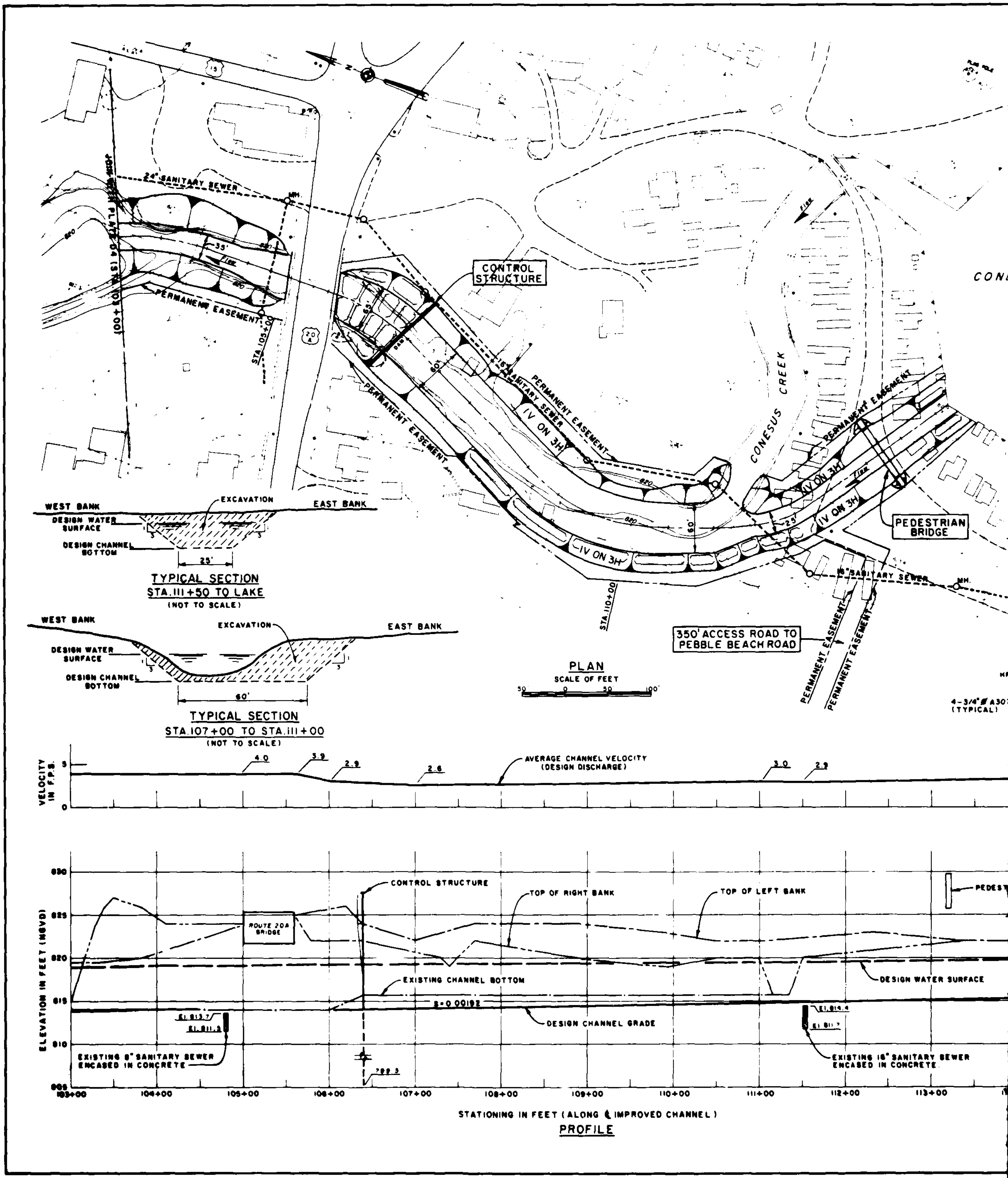
LOCAL FLOOD PROTECTION
SECTION 205

PLAN AND PROFILE

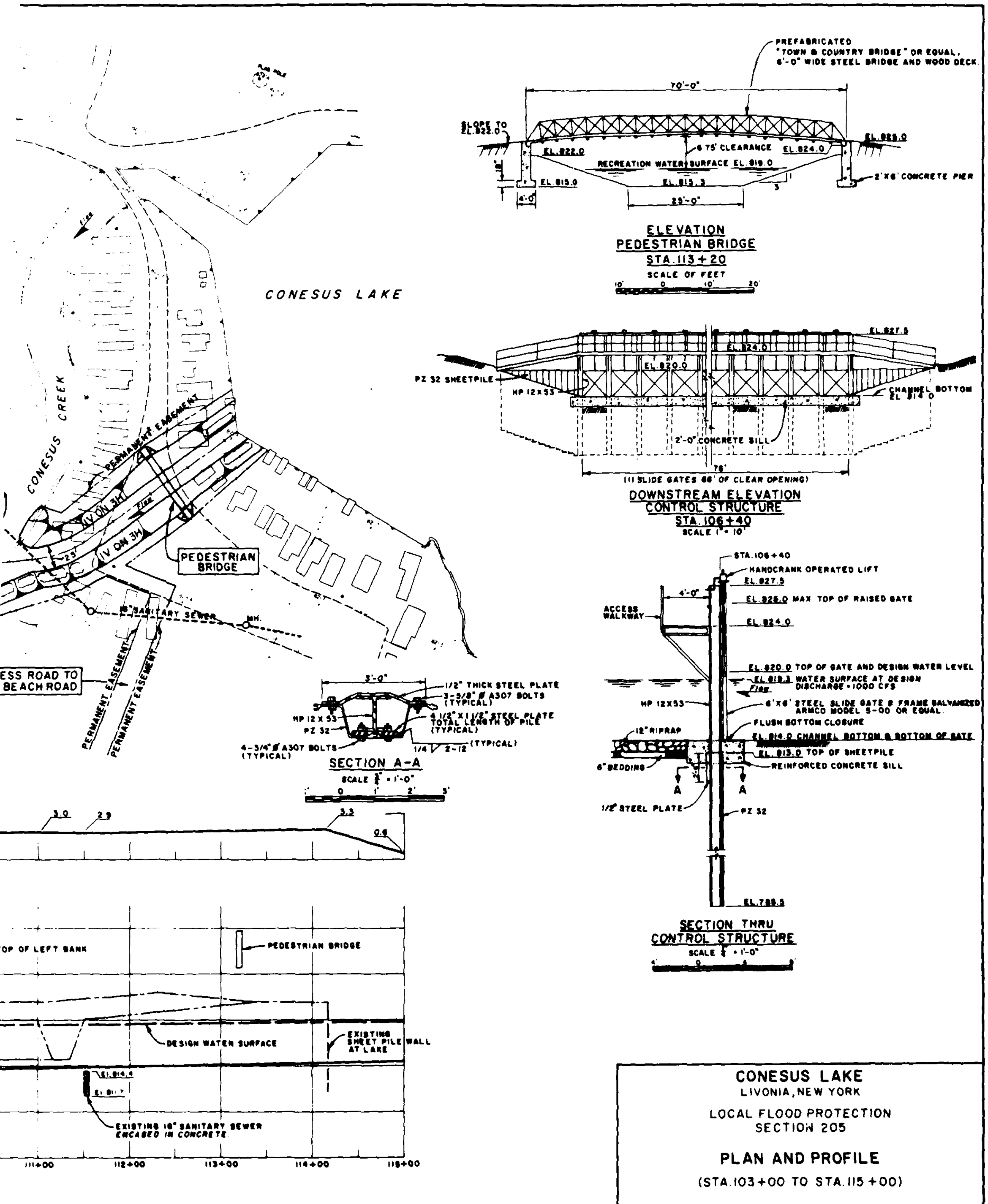
(STA.90+00 TO STA.103+00)

U. S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE D4



24" SANITARY SEWER
M.H.
35'
PERMANENT EASEMENT
STA.105+00
JOIN WITH PLATE D4 (STA.103+00)
20A
CONTROL STRUCTURE
60'
PERMANENT EASEMENT
15" SANITARY SEWER
PERMANENT EASEMENT
1V ON 3H
1V ON 3H
CONESUS CREEK
CONE
PERMANENT EASEMENT
1V ON 3H
1V ON 3H
25'
PEDESTRIAN BRIDGE
15" SANITARY SEWER
M.H.
STA.110+00
350' ACCESS ROAD TO PEBBLE BEACH ROAD
PERMANENT EASEMENT
PERMANENT EASEMENT
4-3/4" Ø A307 (TYPICAL)
PLAN
SCALE OF FEET
50 0 50 100'
WEST BANK
EXCAVATION
EAST BANK
DESIGN WATER SURFACE
DESIGN CHANNEL BOTTOM
25'
TYPICAL SECTION
STA.111+50 TO LAKE
(NOT TO SCALE)
WEST BANK
EXCAVATION
EAST BANK
DESIGN WATER SURFACE
DESIGN CHANNEL BOTTOM
60'
TYPICAL SECTION
STA.107+00 TO STA.111+00
(NOT TO SCALE)
VELOCITY IN F.P.S.
4.0
3.9
2.9
2.6
AVERAGE CHANNEL VELOCITY (DESIGN DISCHARGE)
3.0
2.9
ELEVATION IN FEET (NGVD)
CONTROL STRUCTURE
TOP OF RIGHT BANK
TOP OF LEFT BANK
PEDES
ROUTE 20A BRIDGE
EXISTING CHANNEL BOTTOM
DESIGN WATER SURFACE
S=0.00192
DESIGN CHANNEL GRADE
EL 813.7
EL 811.3
EXISTING 8" SANITARY SEWER ENCASED IN CONCRETE
799.3
EL 814.4
EL 811.7
EXISTING 15" SANITARY SEWER ENCASED IN CONCRETE
830
825
820
815
810
805
103+00
104+00
105+00
106+00
107+00
108+00
109+00
110+00
111+00
112+00
113+00
STATIONING IN FEET (ALONG ℄ IMPROVED CHANNEL)
PROFILE



CONESUS LAKE
LIVONIA, NEW YORK

LOCAL FLOOD PROTECTION
SECTION 205

PLAN AND PROFILE

(STA.103+00 TO STA.115+00)

U.S. ARMY ENGINEER DISTRICT BUFFALO
TO ACCOMPANY DETAILED PROJECT REPORT
1981

PLATE D5

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX E

404 EVALUATIONS

AND

MITIGATION SUMMARY

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

CONESUS LAKE - LIVINGSTON COUNTY, NEW YORK
APPENDIX E

TABLE OF CONTENTS

NOTE: Also reference APPENDIX F - CORRESPONDENCE for pertinent correspondence

FINAL
SECTION 404 EVALUATION
FLOOD PROTECTION
CONESUS LAKE, LIVINGSTON COUNTY
NEW YORK

1. Project Description.

1.1 Introduction. Section 404 Discharges - Section 404 of the Clean Water Act (33 USC 1344) requires the evaluation of the water quality effects of the disposal of dredged or fill materials into navigable waters of the United States. This final evaluation for the proposed Conesus Lake Flood Control Project, has been prepared using the general guidance contained in EC 1105-2-97 dated 8 May 1979 "Implementation of the Clean Water Act," and is being coordinated with the public in conformance with guidance contained in NCDPD-ER letter dated 4 September 1979, "Public Coordination of Section 404(b)(1) Evaluations on Civil Works Projects." Generally the first reference provides guidance on the content of Section 404(b)(1) Evaluations while the second reference states that a public notice, with attached preliminary Section 404 Evaluation, should be issued at the earliest possible time before completion of the Final Environmental Impact Statement.

1.2 Selected Plan. The proposed flood protection alternative - Lake Level Regulation implemented through the 30-60 structural alternative plan for the Conesus Lake shoreline and adjacent areas, in the towns of Conesus, Geneseo, Groveland, and Livonia, Livingston County, NY - involves dredging and bank shaping, as well as the placement of riprap, bedding stone, and steel sheet piling, for a control structure with a poured concrete sill. This evaluation will address the probable physical and biological impacts of this proposed action upon the project area.

1.3 Description of the Proposed Discharge Site for Dredged or Fill Material.

1.3.1 General Characteristics - Conesus Creek cuts through lacustrine deposits which are primarily composed of silty sands. These sands make up the majority of the bank and bottom materials, with scattered stones.

1.4 Quantity. Conesus Creek will require excavation of approximately 48,000 cubic yards of sandy bank and bottom material which will be deposited on the west bank of the creek. This does not include 2,560 cubic yards of material that would be excavated during construction of the new channel. This 2,560 cubic yards of excavated material will not reenter the waters of Conesus Creek and will be trucked away, so therefore is not applicable under Section 404 and will not be evaluated. However, this project would require the placement of approximately 725 cubic yards of stone riprap and bedding stone fill material, 1,500 square feet of steel sheet piling for the control structure, and 35 cubic yards of poured concrete for a sill downstream of the control structure.

1.5 Source. The riprap and bedding material will probably be provided from nearby quarries. These quarries currently produce stone from either the Lockport Formation - a dolostone - or from the Onondaga Formation - a limestone.

1.6 Description of the Proposed Discharge Site for Dredged or Fill Material.

1.6.1 Location and Aerial Extent - The areas of bank modification and filling along Conesus Creek will occur on the left and right banks (looking downstream) for a distance of approximately 650 feet upstream of the Route 20A bridge and primarily along the left bank for distance of about 5,000 feet downstream of the Route 20A bridge. Proposed modifications would result in channel widening, banks being graded to 1 on 3 slope, and some placement of riprap.

1.7 A new control structure, constructed from steel sheet piling, a concrete sill, and sluice gates, will be installed across the creek about 100 feet upstream of the Route 20A Bridge. Both banks and channel bottom between the Route 20A Bridge and the new control structure, and left bank from a distance of about 250 feet upstream from the Route 20A Bridge to a point about 650 feet upstream of the Route 20A bridge (400 feet), would also be lined with 6 inches of bedding stone and topped with 12 inches of stone riprap. In addition, the first 50 feet from the lake - both left and right banks - of the new diversion channel will be lined with riprap.

1.8 Method of Discharge. The actual methods of discharge will be determined at the time of construction. The proposed work would be performed by utilizing a backhoe and bulldozer. The bulldozer would be used to shape and slope the banks as well as spread and grade the stone. Stone would be trucked into the project site. The backhoe would be used to do channel modifications and dredging. Any material dredged from the creek will be deposited just upland on the left bank (west bank) and graded over a corridor 25 feet wide paralleling the bank.

1.9 Timing of Discharge. The actual year of project construction cannot be determined due to the timing of OCE approval and availability of funding. However, to minimize impacts of dredging and discharges on the fishery and wildlife of the creek, an attempt will be made to limit to the summer season. Coordination with U.S. Fish and Wildlife Service (FWS) and New York State Department of Environmental Conservation (NYSDEC) will be maintained to identify any critical periods when there should be no construction.

1.10 Projected Life of the Discharge Site. The construction of the new channel, control structure, and placement of concrete, riprap, and bedding stone fill material will be a one-time occurrence - except for occasional maintenance. These discharges and the use of the sites will occur only at the time of construction and is designed for a 50-year life. Any material removed during the operation and maintenance portion of the project will become the property and responsibility of the local cooperator (NYSDEC).

2. Physical Effects.

2.1 Effects on Wetlands. The proposed discharges will have no significant effect on wetlands currently existing in the vicinity of the project area. (Reference Section 4 in the EIS.)

2.2 Effects on the Water Column.

2.2.1 Light Transmission - Dredging, bank shaping, and the placement of stone riprap will temporarily cause increased turbidity, silt, and sediment suspension, which will reduce light transmission in the water column. Although temporary reduction in light penetration may have some short-term impact on aquatic life forms (i.e., phytoplankton) in the water column, the effect is not expected to be significant. This impact would last during construction and for a short period of time after construction is completed (until turbidity dissipates and settles out). Placement of the steel sheet pile structure and poured concrete sill would have similar impacts.

2.2.2 Aesthetics - Existing creek water color during and immediately after construction would be altered toward a murkier shade until turbidity subsided. After construction is completed, creek banks and some channel bottom zones in the project area would have a man-made appearance due to bank and channel shaping and placement of stone. Eventually, disturbed soils on creek banks above water will become established with vegetation (both natural and planted) and aquatic plants may colonize some water areas in the channel, which would help mitigate construction appearance to some degree. Also, some weed plants will probably invade riprap crevices where wind-blown or water deposited soils collect. The steel sheet pile structure across Conesus Creek may create a riffle zone and most of the piling and concrete would be visible.

2.3 Benthos.

2.3.1 Relative Extent of Loss - The project will result in the covering of approximately 7,200 square feet of creek bottom and banks, resulting in loss of existing benthos, by the introduction of about 725 cubic yards of stone and 35 cubic yards of concrete. Approximately 65,000 square feet of creek banks and bottom will be graded and sloped, resulting in the destruction, displacement, and disturbance of the existing benthos.

2.3.2 Estimated Time Required for Repopulation - The introduced riprap and concrete would provide more stable habitat for benthos in lieu of exposed, more erodible sandy banks. The minor quantity of concrete would provide some stable benthic habitat as well, but due to its relatively smooth uniform texture and design, it would probably provide only minimum habitat for repopulation by invertebrate organisms. However, the increased stabilized submerged surface area created by the placement of stone along the channel bottom and below water on the bank slopes would probably provide increased rough surface area and new habitat for the eventual reinvasion and establishment of benthic organisms when construction is completed. Benthic organisms from nearby upstream and downstream aquatic areas and those which survived construction disturbances would provide sources for early invertebrate recolonization.

2.4 Change in Bottom Geometry, Substrate Composition, and Salinity.

2.4.1 Changes within Conesus Creek will include minor widening of the channel at various locations and the grading of approximately 6,800 feet of

creek banks (6,000 feet of westerly bank and 800 feet of easterly bank) to a 1 on 3 slope. The bottom geometry will experience almost no changes and the only change in substrate will be the introduction of approximately 725 cubic yards of stone, 35 cubic yards of concrete, and 1,500 square feet of sheet steel piling. Since stone and concrete fill materials to be used in this project are considered to be basically inert, no significant impact on creek salinity gradients or on biological communities is anticipated.

3. Chemical-Biological Interactive Effects.

3.1 Exclusion Criteria Determination. The various approaches for testing the chemical-biological interactive effects of the discharge of dredged and fill materials are outlined in 40 CFR 230.4-1(b)(2) and (3). Dredged or fill materials may be excluded from further biological and chemical testing if any of "exclusion criteria" as defined in 40 CFR 230.4-1(b)(1)(i), (ii), or (iii) are met. Briefly summarized, these exclusion criteria are (i) that the dredged material is composed predominately of sand, gravel, or any other naturally occurring sedimentary material with particle sizes larger than silt, usually found in high energy environments; (ii) that the material is suitable and being used for beach nourishment; and (iii) that the material proposed for discharge is primarily the same as at the proposed discharge site. This final criteria requires that the dredged material is sufficiently removed from sources of pollution to provide reasonable assurances that the material is not polluted from such sources, and that adequate conditions are provided on the disposal method to provide reasonable assurance that the discharged material will not be moved by currents or otherwise in a manner that is damaging to the environment outside the disposal area.

3.2 The proposed flood control project at Conesus Creek will place stone riprap, bedding stone, concrete, and steel sheet piling into the creek. Such stone and steel sheet piling are basically inert materials and seem to meet the exclusion criteria defined in 40 CFR 230.4-1(b)(1)(i).

4. Description of Site Comparison (40 CFR 4-1(c)).

4.1 Sediment and Biological Analysis. The dredged material from channel widening and shaping as previously mentioned (paragraph 1.5) will be disposed of along the west bank of Conesus Creek. Since the creek bank is presently exposed to surface runoff and erosion, the dredged material could be reintroduced into the creek and resuspended, and therefore is applicable under Section 404. To determine if this resuspension could reintroduce harmful toxins into the waters of the creek, an elutriate test was performed on the sediments in the creek. The results of this testing program indicated that there were no chlorinated hydro-carbons present in the elutriate. In addition, testing for arsenic, cadmium, chromium, mercury, and lead levels was done to determine at what levels these elements were present. These selected elements are used in National Primary Drinking Water Standards and test results indicated that none of the aforementioned elements were present in greater quantities than the established maximum allowable limits.

Therefore, it was concluded that the dredged material could be disposed of safely on the west bank of Conesus Creek between the lake and sewage treatment plant.

5. Water Quality Considerations.

5.1 Fill and Disposal Operations. Since the material to be used as fill meets exclusion criteria (40 CFR 230.4-1(b)), no further testing will be conducted. Dredged material will be disposed of on the west bank and has been found not to be polluted and safe for disposal at this location.

5.2 The project will unavoidably cause increased turbidity and resuspension of some bottom material, due to spillover when dredging occurs. These impacts are anticipated to be minor and should dissipate after construction is completed.

5.3 Water Quality Certificates. As stated in NYSDEC letter dated 6 August 1979 (on file at the Buffalo District Office), whenever NYSDEC is a local cooperator on flood control projects, they waive the necessity for requiring a 401 Water Quality Permit. NYSDEC is a local cooperator on this proposed project and therefore a water quality certificate is not required.

6. Selection of Discharge Sites for Dredged or Fill Material.

6.1 Introduction. The criteria to be used in determining the selection of disposal sites for dredged and fill materials to be placed in waters of the United States are defined in 40 CFR 230.5. The various criteria and their relationship to the proposed project for Conesus Creek are discussed in the following paragraphs.

6.2 Need for the Proposed Activity. The Conesus Lake shoreline has had a history of flooding and due to extensive development, the public has suffered significant economic damages. The Corps of Engineers, during its investigation into the flooding problems, has determined that it is economically and environmentally feasible and in the best interest of the public to construct a flood control project at Conesus Lake. The project would consist of constructing a new control structure across Conesus Creek, which would allow implementation of a new lake level regulation plan designed to reduce flood damages.

6.3 Alternative Sites and Methods of Discharge Considered. The Conesus Lake Flood Control Study investigated a number of possible plans and sites which called for creek modifications along Conesus Creek. The results of the planning effort concluded that the Lake Level Regulation Plan in conjunction with the structural 30-60 Alternative (Figure EIS 1) meet the objectives of the study, namely, flood damage reduction.

6.4 Disposal Methods. Actual disposal or filling methods will not be known until the time of construction.

6.5 Objectives in Discharge Determinations. The general objectives to be considered in designating a discharge site for dredged or fill materials

are defined in 40 CFR 230.5(a)(1) to (8). These summarized objectives state that discharge activities should avoid: (1) significant disruptions to the chemical, physical, and biological integrity of the aquatic ecosystem; (2) significant disruptions to the food chain; (3) significant disruptions to the movement of fauna into and out of breeding, feeding, and nursery areas; (4) destruction of wetlands; (5) disruption of areas that serve to contain flood waters; (6) significant increases in turbidity; (7) severely affecting aesthetic, recreational, and economic values; and (8) avoid degradation of water quality as specified in 40 CFR 230.4, and 230.5(c) and (d). In addition, this action should have no significant adverse effects on diversity of plant and animal species, as well as Rare and Endangered Species.

6.6 The proposed flood protection project at Conesus Lake as described in the Draft Detailed Project Report, Draft Environmental Impact Statement, and this Preliminary Section 404 Evaluation, all indicate that this project meets the aforementioned objectives outlined in paragraph 6.5.

6.7 Impacts on Water Uses at Proposed Discharge Site. Impacts along Conesus Creek caused by the introduction of riprap, bedding stone, concrete, and steel sheet piling are addressed in the following paragraphs:

6.7.1 Municipal Water Supply - There are no water intakes within the construction area. However, there are two municipal intakes in the lake but these are located approximately a quarter mile away from the immediate construction zone. Also, the Lake Level Regulation Plan has taken these intakes into consideration by not lowering the lake to an elevation that would expose the intakes.

6.7.2 Shellfish - There are no known significant fresh water shellfish reported within the project area. Therefore, no significant impacts are anticipated.

6.7.3 Fisheries

a. Biological field surveys were conducted for Conesus Lake and its tributaries (White and Alldridge, 1978-79). The results of these surveys and conclusions drawn indicate that little change in the faunal composition of the creek would be expected and lake species would continue to move into the outlet creek.

b. The immediate project area - from the lake to the Route 20A Bridge - will experience significant disturbances that will affect the existing fishery. It is anticipated that the major impacts to the fishery will be to displace fish from the area - fish may move back into the lake and/or move further downstream. This impact is expected to be temporary with similar species returning to the area after construction is completed.

6.7.4 Wildlife - No significant impacts on wildlife are expected to occur. Some wildlife may be displaced from the area during actual construction, but could utilize new habitat after construction is completed and vegetation plantings become established.

6.7.5 Recreation - The construction area is utilized by recreationists that launch private boats or rent small boats from a boat and bait store located just upstream of Route 20A bridge. Such business and the renting and launching of boats will be impacted on for approximately 6 months during actual construction. Once the project is completed, access to the lake will be improved by shorter distances to the lake and deeper draft for boats.

6.7.6 Threatened and Endangered Species - Although the project area is within the general range of certain protected species, the likelihood of finding such species within the project area, other than as transients, is very low. Therefore, the proposed discharges should have no significant effect on threatened or endangered species or their critical habitats as defined in the Endangered Species Act.

6.7.7 Wetlands - The proposed discharges will have no significant effect on existing wetlands within the project area.

6.7.8 Benthic Life - The discharges will inevitably cover some existing benthic life. Biological studies of the area show that benthic invertebrate species present in Conesus Creek are typically common species that are abundant in the lake. The addition of more stable stone provided by riprap may increase the submerged surface area of the creek, which should eventually provide habitat on the stone and among rock crevices for possible recolonization of benthic organisms from the lake invertebrate population.

6.7.9 Submerged Vegetation - Aquatic plants are sparse throughout the construction zone in Conesus Creek. The bottom of the creek will not be significantly covered with riprap or concrete, except just below the control structure, where approximately 6,000 square feet of creek bottom would be covered. Since most of the existing creek bottom will be unaffected, impacts to submerged vegetation are anticipated to be minor.

6.7.10 Size of Disposal Area - The size and quantity of material (stone, concrete, and steel sheet piling) to be placed in Conesus Creek is the minimum necessary to enable construction of the new control structure and provide erosion protection. The new control structure will make it possible to implement the new lake level regulation plan which provides flood protection to the Conesus Lake shoreline (a 25-year flooding event).

6.8 Considerations to Minimize Harmful Effects. All appropriate considerations to minimize the harmful effects of the disposal of dredged or fill materials as defined in 40 CFR 230.5(c)(1-7) associated with the Conesus Lake flood control project have been considered in specifying the proposed disposal sites. These considerations, as summarized, include 40 CFR 230.5(c)(1) water quality criteria; (2) alternatives to open-water disposal; (3) physical characteristics of alternative disposal sites; (4) ocean dumping; (5) covering contaminated material with clean material; (6) minimize runoff from confined areas on the aquatic environment; and, (7) coordination of potential monitoring activities with EPA.

7. Use of Materials from a Land Source and Mixing Zone Determinations.

7.1 40 CFR 230.5(d) prohibits the discharge of fill materials from a land source when these materials are contaminated. The only land source materials to be discharged into Conesus Creek are relatively inert stone, concrete, and steel sheet piling. These materials will be used in the construction of a control structure, for bank stabilization and erosion control.

7.2 The mixing zone has been determined to be the smallest practicable area within each specified disposal zone, consistent with the objectives of the project and guidelines set down in 40 CFR 230.

8. Conclusion and Determination.

8.1 I have reviewed the documents pertinent to the construction of a flood control project at Conesus Lake, Livingston County, NY, and have concluded that:

8.1.1 An ecological evaluation has been performed following the evaluation guidance contained in 40 CFR 230.4, in conjunction with the evaluation considerations in 40 CFR 230.5 (40 CFR 230.3(d)).

8.1.2 Appropriate measures have been identified and incorporated into the proposed plan to minimize adverse effects on the aquatic environment as a result of the discharge (40 CFR 230.3(d)(1)).

8.1.3 Consideration has been given to the need for the proposed activity, the availability of alternative sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law (40 CFR 230.5).

8.1.4 No wetlands will be adversely affected by construction of this project.

9. Findings. I find that the placement of approximately 725 cubic yards of stone, 35 cubic yards of concrete, and 1,500 square feet of steel sheet piling, in the form of riprap, a poured concrete sill, and the control structure, respectively, has been evaluated through application of Section 404(b)(1) of the Clean Water Act guidelines and applicable Corps of Engineers Regulations.

Date 9/25/81

GEORGE F. JOHNSON
Colonel, Corps of Engineers
Commanding

SECTION 404 EVALUATION
FLOOD PROTECTION
CONESUS LAKE, LIVINGSTON COUNTY, NEW YORK

WETLAND MITIGATION

1. Project Description.

1.1 Introduction. Section 404 Discharges - Section 404 of the Clean Water Act (33 USC 1344) requires the evaluation of the water quality effects of the disposal of dredged or fill materials into navigation waters of the United States. This evaluation for the proposed Conesus Lake Flood Control Project, has been prepared using the general guidance contained in EC 1105-2-97 dated 8 May 1979 "Implementation of the Clean Water Act," and is being coordinated with the public in conformance with guidance contained in NCDPD-ER letter dated 4 September 1979, "Public Coordination of Section 404(b)(1) Evaluations on Civil Works Projects." Generally, the first reference provides guidance on the content of Section 404(b)(1) Evaluations, while the second reference states that a public notice, with attached preliminary Section 404 Evaluation, should be issued at the earliest possible time before completion of the Final Environmental Impact Statement.

1.2 Selected Plan. The proposed flood protection alternative - Lake Level Regulation implemented through the 30-60 structural alternative plan for the Conesus Lake shoreline and adjacent areas, in the town of Conesus, Geneseo, Groveland, and Livonia, Livingston County, NY - involves dredging and bank shaping, as well as the placement of riprap, bedding stone, and steel sheet piling, for a control structure with a poured concrete sill. It also involves scalping, grading, and planting of vegetation in the New York State Department of Environmental Conservation's (NYSDEC) newly acquired wetland-referred to as the Ames parcel located at the southern end of Conesus Lake on the Inlet Creek - for the purpose of expected loss of northern pike spawning habitat. These mitigative measures are being performed at the request of NYSDEC and the U.S. Fish and Wildlife Service (FWS), since with implementation of the proposed Conesus Lake level management plan, spring water levels in Conesus lake are not expected to go higher than 819.0. This elevation will reduce the area presently utilized by northern pike as spawning habitat within the Ames parcel - portions of which are subject to occasional flooding in the spring (depending upon rates and amounts of snowmelt and/or precipitation). (Reference para. 2.1.2 which further describes importance of wetland.)

1.3 This Section 404 Evaluation will only address the applicable physical, and biological impacts caused by construction work performed in the Ames parcel. Probable impacts caused by other aspects of the selected plan were addressed and evaluated in a prior Section 404 Evaluation, which is contained in Appendix E of "Stage III Detailed Project Report and Environmental Impact Statement, Conesus Lake, New York," dated July 1981.

1.4 Description of the Proposed Discharge of Dredged or Fill Material.

1.4.1 General Characteristics - Conesus Inlet cuts through lacustrine deposits which are primarily composed of sandy silts. These silts make up the majority of the material in this area.

1.5 Quantity. An area approximately 10 acres in size within the Ames parcel wetland would be scalped to an average depth of 1.2 feet. This will require excavating approximately 19,500 cubic yards of sandy silt material which will be redeposited within the wetland to form a berm around the graded area except along the creek bank. There will be no deposition of fill material into the waters of Conesus Inlet Creek.

1.6 Source. Soil scalped off the wetland (dredged material) will be redeposited back into the wetland (as fill material) to construct the berm. Although a majority of the 10-acre area will be scalped, rough graded and approximate elevations obtained, some small "islands" of existing vegetation will be left undisturbed to provide diversity and some natural seed sources (to aid in revegetation) in the wetland.

1.7 Description of the Proposed Discharge Site for Dredged or Fill Material.

1.7.1 Location and Areal Extent - The area to be modified is located in the southern section of the Ames parcel (Reference Plate 1). The approximate 10 acre area will be graded so that the base of the berm ground elevation will be 818.5 and, from the base of the berm to the creek bank the wetland will be graded and sloped so that at the creek edge the elevation will be 817.5.

1.8 Method of Discharge. The actual method of grading will be determined at the time of construction. Construction equipment such as a bulldozer, and front end loader will be used to slope and grade project portion of the wetland and to shape the berm.

1.9 Timing of Discharge. The actual year of project construction cannot presently be determined, due to the timing of Office of the Chief of Engineers approval and availability of funding. However, to minimize impacts on fish spawning and hatching within the wetland and to facilitate the vegetative planting and construction (during months when soil conditions may be drier) - wetland construction work would be scheduled for the period July through September.

1.10 Projected Life of the Discharge Site. Scalped material that is presently located within the construction zone will be utilized in berm construction. The berm will not be subject to any significant adverse detrimental conditions that could cause decay or destruction of the berm. The berm is expected to have a long-term life - well beyond the 50-year life of the Conesus Lake project. Upon completion of the earth berm, it would be seeded with a herbaceous species or mixture of vegetation to reduce potential for erosion and to provide wildlife habitat.

2. Physical Effects.

2.1 Loss of Wetland. Approximately 13.5 acres of the existing wetland will be modified. Of this total amount, about 10 acres would be scalped and graded and about 3.5 acres would be covered by berm material. A berm approximately 2,300 feet long by 58 feet wide by 5-1/2 feet high will be constructed out of material obtained from the grading and scalping (Reference Plate 3). This berm construction will create a higher elevation within the wetland which should succeed to a more terrestrial habitat.

2.1.1 Wetland Productivity - The wetlands are known to be utilized by northern pike for spawning and as a nursery area when water levels are sufficient to flood the hydrophilic grasses in the spring. The actual annual production and successful survival of northern pike that hatch in this wetland - which adds to recruitment of this fish species in the lake - is unknown.

2.1.2 Importance of the Wetland - This wetland is approximately 46 acres in size and is seasonally or intermittently wet, with most flooded potholes and hummocks drying up annually. As such, the quality of wildlife habitat for aquatic furbearers and waterfowl is not considered to be very good. The wetland provides habitat for game and nongame wildlife such as deer, ring-necked pheasants, fox, skunk, raccoon, woodchucks, rabbit, mice, voles, predatory birds and songbirds. Northern pike do migrate into this wetland to spawn during the spring season. As spring water levels recede, many northern pike eggs, larvae and fry become trapped and die, thereby never reaching the lake. Lake elevations must remain at 819.0 until all pike have spawned and hatched, so the fry have sufficient time to migrate into the Inlet Creek or lake.

2.1.3 Are the Wetlands Set Aside? - The wetlands are owned by NYSDEC and will remain as a State-owned wetland.

2.1.4 Characteristics of Contiguous Wetlands - In general, the wetland area adjoining the wetland to be scalped and graded consists of essentially the same habitat type relative to vegetation and topography and, is exposed to similar influence of rises and fall in Conesus Lake levels. Contiguous wetlands would not be significantly altered.

2.1.5 Do Wetlands Significantly Shield Other Areas? - The wetlands shield the upland (terrestrial) portion of the wetland from wave action, erosion and storm damage. This project will not alter this shielding effect significantly. The construction of the berm will provide protection up to elevation 824.0. The remaining wetland should continue to function as it did, previous to construction.

2.1.6 Prime Natural Recharge Areas - This wetland is not a prime recharge area and a significant portion of the wetland is relatively dry most of the year. The wetland is flooded in the spring by Conesus Lake and is mainly influenced by lake elevations.

2.2 Effects on the Water Column.

2.2.1 Light Transmission - The grading operation should have no significant effect on light transmission. Some increased turbidity may occur when construction equipment is grading soil near the Inlet Creek, but this impact would be temporary and effects on phytoplankton should not be significant. These impacts are expected to last during construction, and for a short period after construction is completed, until turbidity dissipates and settles out.

2.2.2 Aesthetics - Existing Inlet Creek water color during and immediately after construction would be temporarily altered due to any unavoidable disturbance of creek sediments, debritus, and silt suspension by construction activity, until turbidity subsides. During the grading, scalping, and berm construction, a portion of the existing wetland will be stripped of vegetation. The disturbed area will be revegetated as soon as practicable during or after construction is completed. When vegetation reestablishes, the berm should not be very visible and the wetland should take on a preconstruction appearance relative to its previous vegetative type.

2.3 Benthos.

2.3.1 There will be no work done under water, so there should be no significant direct loss of benthos or benthic habitat. Indirectly, construction may unavoidably cause some increased sedimentation or increased erosion which could wash into the creek during a rainstorm and cover some existing benthos in the creek and lake. This impact is anticipated to be minor.

2.4 Change in Bottom Geometry Substrate Composition and Salinity.

2.4.1 Topographic changes within the Ames parcel will result in 10 acres being graded, so that at the base of the berm the elevation will be 818.5 and, the area will be sloped so that at the creek bank the elevation will be 817.5. The berm will basically change a portion of the wetland to higher terrestrial land type. No impact on the creek's salinity is expected.

3. Chemical-Biological Interactive Effects.

3.1 Exclusion Criteria Determination. The various approaches for testing the chemical-biological interactive effects of the discharge of dredging and fill materials may be excluded from further bilological and chemical testing if any of "exclusion criteria" as defined in 40 CFR 230.4-1(b)(1)(i), (ii), or (iii) are met. Briefly summarized, these exclusion criteria are (i) that the dredged material is composed predominately of sand, gravel, or any other naturally occurring sedimentary material with particle sizes larger than silt, usually found in high energy environments; (ii) that the material is suitable and being used for beach nourishment; and (iii) that the material proposed for discharge is primarily the same as at the proposed discharge site. This final criteria requires that the dredged material is sufficiently removed from sources of pollution to provide reasonable assurances that the material is not polluted from such sources, and that

adequate conditions are provided on the disposal method to provide reasonable assurance that the discharged material will not be moved by currents or otherwise in a manner that is damaging to the environment outside the disposal area. The berm will be constructed from the material that is obtained from grading and seems to meet the exclusion criteria defined in 40 CFR 230.4-1(b)(1)(iii).

4. Description of Site Comparison (40 CFR 230.4-1(c)). The dredged material obtained by the scalping procedure will be disposed of within the Ames parcel and used to construct the berm. The berm will surround the mitigated area in a somewhat irregularly aligned fashion and will cover approximately 3.5 acres of land. The berm will be seeded with a herbaceous seed mixture to help stabilize the berm and to help minimize erosion.

5. Water Quality Considerations.

5.1 Fill Operations. Since the material to be used in berm construction meets exclusion criteria (40 CFR 230.4-1(n)). No further testing will be conducted.

5.2 The project will cause some increase in turbidity and erosion. These impacts are anticipated to be temporary and minor and should dissipate after construction and seeding is completed.

5.3 Water Quality Certificates. As stated in NYSDEC letter dated 6 August 1979 (on file at the Buffalo District Office), whenever NYSDEC is a local cooperator on flood control projects, they waive the necessity for requiring a 401 Water Quality Permit. NYSDEC is a local cooperator on this proposed project and therefore a water quality certificate is not required.

6. Selection of Discharge Sites for Dredged or Fill Material.

6.1 Introduction. The criteria to be used in determining the selection of disposal sites for dredged and fill materials to be placed in waters of the United States are defined in 40 CFR 230.5. The various criteria and their relationship to the proposed project for Conesus Lake are discussed in the following paragraphs:

6.2 Need for the Proposed Activity. The Conesus Lake Flood Control Project will regulate lake levels so that the likelihood of the lake reaching elevations of 819 to 821 will be diminished. This reduction in lake level elevations, will prevent inundation of portions of the Ames wetland that were subject to flooding in the spring season. This in turn, would reduce the available potential habitat utilized by northern pike for spawning. Therefore, to mitigate for the loss of some spawning habitat, a wetland area will be shallowly scalped, graded, and revegetated, to improve spawning and nursery habitat in order to provide for more potentially dependable water inundation on wetland soils that formerly dried out after lake levels receded, thereby trapping and killing many fish eggs and hatched fry.

This mitigative measure will grade the wetland acreage so that at the new proposed target lake elevations, the project wetland area will more likely be covered with a sufficient depth of water during the spawning/nursery season,

so that it would be available to northern pike for spawning. The recommended acreage for grading was provided to the Corps by NYSDEC and the USFWS.

6.3 Alternative Sites and Methods of Discharge Considered.

6.3.1 Other alternative disposal methods for dredged/fill material considered were as follows:

Alternative No. 1 - Scalp and grade two areas (referred to as Area A and Area B on Plate 2) along the east bank of Inlet Creek within the NYS Department of Environmental Conservation's wetland (former Ames tract) and, redeposit such material into a berm along the eastern fringe of the scalped/graded areas (locations approximately indicated by NYSDEC on Plate 2). Area A, located at the northwestern end of the State-owned wetland is about 5.2 acres in size and Area B, located at the southwestern end of the State-owned wetland is about 3.5 acres in size. This alternative which includes Area A - the area closest to Conesus Lake - could not be graded within a reasonable cost due to soft and wet soil conditions. If this area were to be graded the cost would likely be excessive, grading elevations desired by NYSDEC to maintain northern pike spawning habitat could not be accurately attained; heavy equipment would likely cause considerable disruption to existing topography and to water quality on wet soils; access by construction equipment would be difficult and construction of a temporary access road to move equipment, as well as removal of the road from the wetland would disrupt more of the wetland. Consequently, dredging and filling in Area A was dropped from further consideration. Area B contains more stable soils to accomplish dredge/fill construction work to attain grade elevations to provide for more dependable water levels in the northern pike spawning habitat area. Area B alone would not provide enough acreage desired by NYSDEC to mitigate for loss of such habitat. Therefore, Area B as shown on Plate 2 was not considered further.

Alternative No. 2 - Haul scalped soil out of the wetland by truck and redeposit the dredged material into an upland site. This alternative would cause additional disruption to parts of the wetland on which a temporary access roadway would have to be constructed to accommodate haul trucks. Cost of hauling such material to some designated upland disposal site (not likely to be close since the Conesus Lake shoreline is heavily developed) would be expensive and could adversely effect the Benefit/Cost Ratio of the project.

6.4 Objectives to be Considered in Discharge Determination. General objectives to be considered in designating a discharge site for dredged or fill matrials are defined in 40 CFR 230.5(a)(1) to (8). These objectives, briefly summarized, state that discharge activities should try to avoid: (1) significant disruptions to the chemical, physical and biological integrity of the aquatic ecosystem; (2) significant disruptions to the food chain; (3) significant impact on diversity of plant and animal species; (4) significant disruptions to the movement of fauna into and out of breeding, feeding and nursery areas; (5) destruction of wetlands; (6) disruption of areas that serve to contain flood waters; (7) significant increases in turbidity; (8) severely affecting aesthetic, recreational, and economic values; in addition this action should have no significant adverse effect on

(9) threatened and endangered species, and (10) significant degradation of water quality as specified in 40 CFR 230.4 and 230.5(c) and (d). No significant disruptions to aforementioned parameters 1 through 4 and 6 through 10 are anticipated. In the case of parameter 5, some change in existing topography of the NYSDEC owned wetland (which is estimated to be about 46± acres in total size) due to scalping, grading, and installation of a berm and operation of construction equipment wil occur in order to attain the mitigation desired by NYSDEC. To help minimize construction degradation on the aforementioned parameters, as well as on aesthetic, recreational, and economic value of navigable waters, methods to protect the environment outlined in the Corps of Engineers Civil Works Construction Guide Specification CW-01430, dated July 1978 "Environment Protection," would be part of the objectives to be considered in discharge determination.

6.5 Impacts of Water Uses at the Proposed Discharge Site.

a. Municipal Water Intakes - There are no municipal water intakes within the wetland project area or immediately downstream; therefore, no significant impact is anticipated.

b. Shellfish - There are no known significant freshwater shellfish reported within the project area; no significant impact on this resource is anticipated.

c. Fisheries - Under existing conditions, northern pike spawn and hatch in low-lying grassy water filled potholes in the spring season. Since the wetland and Inlet Creek water levels are influenced by the level of adjacent Conesus Lake, as water levels recede, young northern pike fry are stranded and eventually die as water in the potholes dries up. Scalping and grading about a 10-acre portion of the NYSDEC wetland would provide more dependable water levels in the spawning habitat and would remove hummock barriers in the wetland project area, thereby allowing more potential for newly hatched fish to follow receding water levels toward inlet creek and lakeward. Scalping, grading, and berm construction work would be done sometime during the period of July through September when water has receded from the wetland and conditions are drier. After construction, the disturbed wetland area would be seeded to grass, in order to restore the wetland to its original plant cover type (presently dominated by reed canary grass) as much as would be practical and possible. A tentative proposal to accomplish seeding would be to seed as soon as scalping and grading has been accomplished and, as soon as the soil has dried to some degree to make seeding possible. Preferably, seeding would be accomplished during the period of July through September after most wildlife nesting is completed and before the end of the plant growing period. The seeding would then be monitored for establishment during the year in order to determine its success. If necessary, another grass seeding would be done following the initial year of monitoring.

During construction, some siltation and stream turbidity would unavoidably occur, which may destroy, disturb, and displace some fish and associated fish spawning habitat in the Inlet Creek and in the general vicinity downstream where the creek enters Conesus Lake. To help minimize this impact, methods

to protect land and water resources outlined in the Corps of Engineers Civil Works Construction Guide Specification CW-01430 dated July 1978 would be followed.

After construction, until grass plants once again establish through physical and natural seeding, there may be temporary loss of northern pike spawning habitat in the 10± acre wetland disrupted by construction, due to removal of much of the existing vegetation by scalping and grading. Some small scattered "islands" of existing vegetation would not be scalped in order to maintain some diversity and natural seed sources in the disturbed area.

The wetland zone covered by the proposed berm (about three surface acres) would no longer be available for fish spawning. Additionally, a narrow strip of wetland spawning habitat immediately along the outward toe of the berm (approximately 25 feet wide and 2,300 feet long = 1.3± acres) - used by construction equipment for maneuvering while rough grading the outer toe of the berm - would be temporarily disturbed as spawning habitat. Existing grasses and broadleaf herbaceous plants would be disrupted and unavoidably some rutting of soil would occur.

d. Wildlife - This wetland contains a variety of hummocks and low potholes and slightly higher terrain that is interspersed with woody and herbaceous vegetation that provides potential food, cover and nesting habitat for game and nongame species of wildlife. Dense growths of reed canarygrass and entanglements of swamp loosestrife are common to this wetland, along with rice cutgrass, arrow-arum, forget-me-not and smartweed. Buttonbush (an aquatic shrub) is established to some degree in the wetland, and dogwood shrubs and uneven aged trees (i.e., ash, red maple) - both dead and alive - are established on hummocks and slightly higher terrain. Aquatic vegetation in Inlet Creek consists of submergent plants such as water milfoil and coontail, whereas arrow-arum is the dominant broadleaf emergent plant along its peripheral muddy shoreline.

Construction disturbance to the aforementioned existing wetland would unavoidably adversely impact food, cover, nesting, and brooding habitat for wildlife using the project zone. Although construction activity would occur after much of the wildlife nesting season is over, some small mammals (i.e. - rabbits, mice, and other rodents) hidden in vegetation may be destroyed or displaced as habitat was scalped and graded. As previously indicated some small "islands" of vegetation within the wetland would be left intact. Eventual reestablishment of herbaceous vegetation by both natural means and by seeding would help mitigate for such wildlife habitat loss to some degree. Winter food/cover habitat on scalped soils would be temporarily destroyed until vegetation becomes reestablished. Maintenance of water levels at/about the 819 elevation from 1 March - 15 June for northern pike spawning under the proposed lake level management plan, would probably tend to favor aquatic wildlife over terrestrial wildlife. During this seasonal period, water approximately 6- to 8-inches deep would be standing over soils that were formerly subject to receding lake water levels which exposed soils to drier, more terrestrial conditions.

e. Recreation Activities - Since construction would probably generate some unavoidable temporary increase in water turbidity in Inlet Creek (even though precautions would be taken to minimize this effect by the Contractor), there may be some temporary adverse impact on recreation fishing downstream of the project zone until construction ceases and water clarity normalizes to preconstruction conditions. Construction work in the late summer, fall and/or winter seasons would temporarily preclude sport hunting in and around the project work zone during construction and, until vegetation reestablished on disturbed soils. Construction generated dusts, noise and presence of equipment would temporarily detract from the aesthetic natural appearance of the wetland resource being disturbed.

f. Threatened or Endangered Species - Except for transient species, no Federally listed or proposed threatened or endangered species are known to exist in the Conesus Lake area (letter of communication with the U.S. Fish and Wildlife Service dated 1 October 1980). A Corps ecologist observed several specimens of Cardinal flower (Lobellia cardinalis) - a New York State protected plant under Section 9-1503 of the Environmental Conservation Law - growing in the wetland (bloom was observed in August). Their approximate site locations are shown on Plate 1. Precautions would be taken to preserve these plant sites by marking the areas with stakes and leaving small undisturbed islands at these locations during construction.

g. Wetlands - Approximately 10 acres of this wetland will be scalped, graded, and revegetated (Plate 1). The area will be bordered on the north, south and east (except on its western creek side) by a trapezoidal berm (about 2,300 feet long), 5-1/2 feet in height, with a base width of 58 feet and sideslopes of 1 foot vertical to 4 feet horizontal. The top of the berm will be approximately 18 feet wide. The construction of this berm will cover approximately 3.5 acres of the wetland and probably cause a portion of this berm to succeed to terrestrial habitat due to its higher elevation. In addition approximately 1.5 acres of the wetland located on the immediate upland side of the berm will be temporarily disturbed by construction equipment during grading and shaping of the berm. Upon completion of the grading, the graded portion of the wetland at the base of the berm would be at the approximate elevation of 818.5. From the base of the berm to the creek bank, the wetland will be sloped very gently, so that at the creek bank, the elevation would be 817.5. This would allow 6 inches to 18 inches of water to cover the mitigated area available to northern pike when Conesus Lake is at elevation 819.0 during the spring spawning period.

h. Submerged Vegetation - Submerged and floating aquatic plants are sparse in the Inlet Creek between the project zone downstream to Conesus Lake. Grading along the creek in the area of wetland mitigation will be limited to approximately a 500-foot strip. Therefore, impacts due to grading and anticipated increased turbidity in the creek from construction activities should not produce significant impacts to aquatic plants.

i. Size of Disposal Area - The area of wetland to be graded and the quantity of material scalped off the wetland (approximately 19,500 cubic yards) is the considered minimum construction necessary to mitigate for loss of fishery habitat anticipated by the proposed lake level regulation plan.

6.6 Considerations to Minimize Harmful Effects. All appropriate considerations to minimize the harmful effects of the disposal of dredged or fill materials as defined in 40 CFR 230.5(c)(1-7) associated with the Conesus Lake flood control project have been considered in specifying the proposed disposal sites. These considerations, as summarized, include 40 CFR 230.5(c)(1) water quality criteria; (2) alternatives to open-water disposal; (3) physical characteristics of alternative disposal sites; (4) ocean dumping; (5) covering contaminated material with clean material; (6) minimize runoff from confined areas on the aquatic environment; and (7) coordination of potential monitoring activities with EPA.

7. Use of Materials from a Land Source and Mixing Zone Determinations.

7.1 40 CFR 230.5(d) prohibits the discharge of fill materials from a land source when these materials are contaminated. The only discharge will be the grading and redistributing of existing material within the wetland. No new fill material will be introduced.

8. Conclusion and Determinations.

8.1 I have reviewed the documents pertinent to the construction of a flood control project at Conesus Lake, Livingston County, NY, and the mitigation plan for the Ames wetland and have concluded that:

8.1.1 An ecological evaluation has been performed following the evaluation guidance contained in 40 CFR 230.4, in conjunction with the evaluation considerations in 40 CFR 230.5 (40 CFR 230.3(d)).

8.1.2 Appropriate measures have been identified and incorporated into the proposed plan to minimize adverse effects on the aquatic environment as a result of the discharge (40 CFR 230.3(d)(1)).

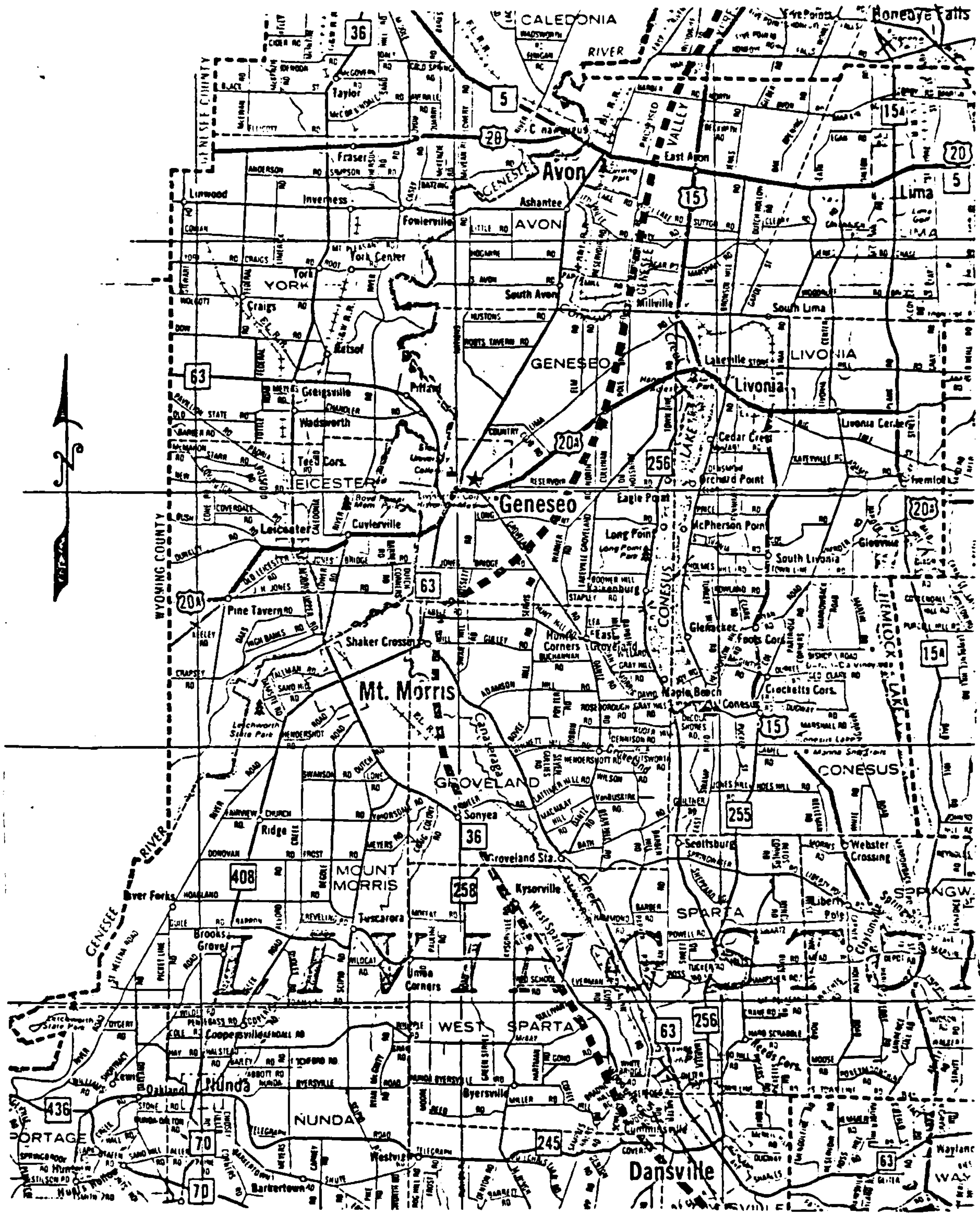
8.1.3 Consideration has been given to the need for the proposed activity, the availability of alternative sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law (40 CFR 230.5).

8.1.4 No wetlands beyond the approximate amount indicated in paragraphs 2.1 and 6.5g will significantly be adversely affected by construction of this project.

9. Findings. I find that the movement of approximately 19,500 cubic yards of sandy silts within a 10-acre area within the Ames wetland for the purpose of grading, scalping, and berm construction has been evaluated through application of Section 404(b)(1) of the Clean Water Act guidelines and applicable Corps of Engineers Regulations.

Date 12/19/84

GEORGE P. JOHNSON
Colonel, Corps of Engineers
District Engineer

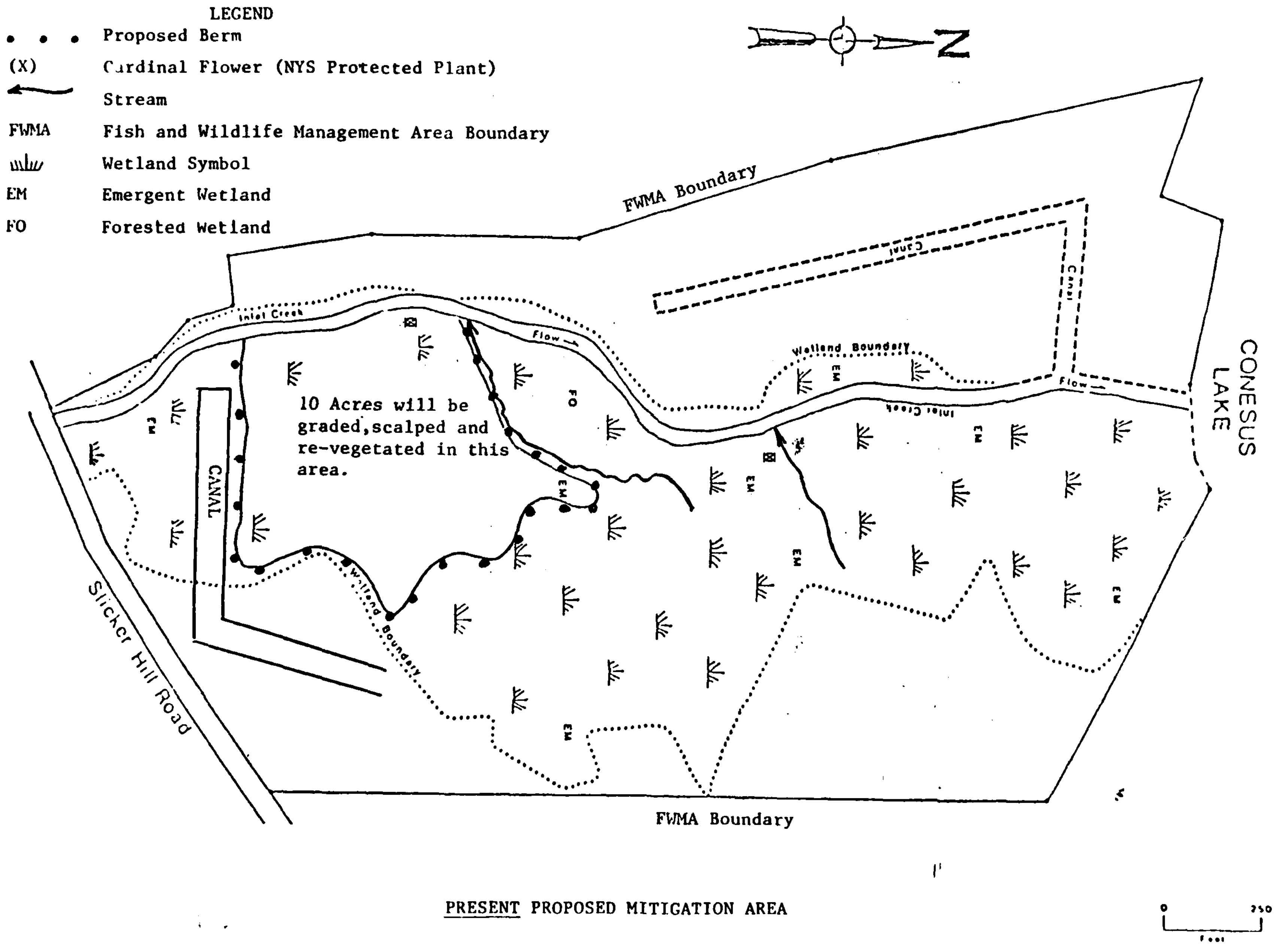


CONESUS LAKE, NEW YORK

VICINITY MAP

FIGURE 1

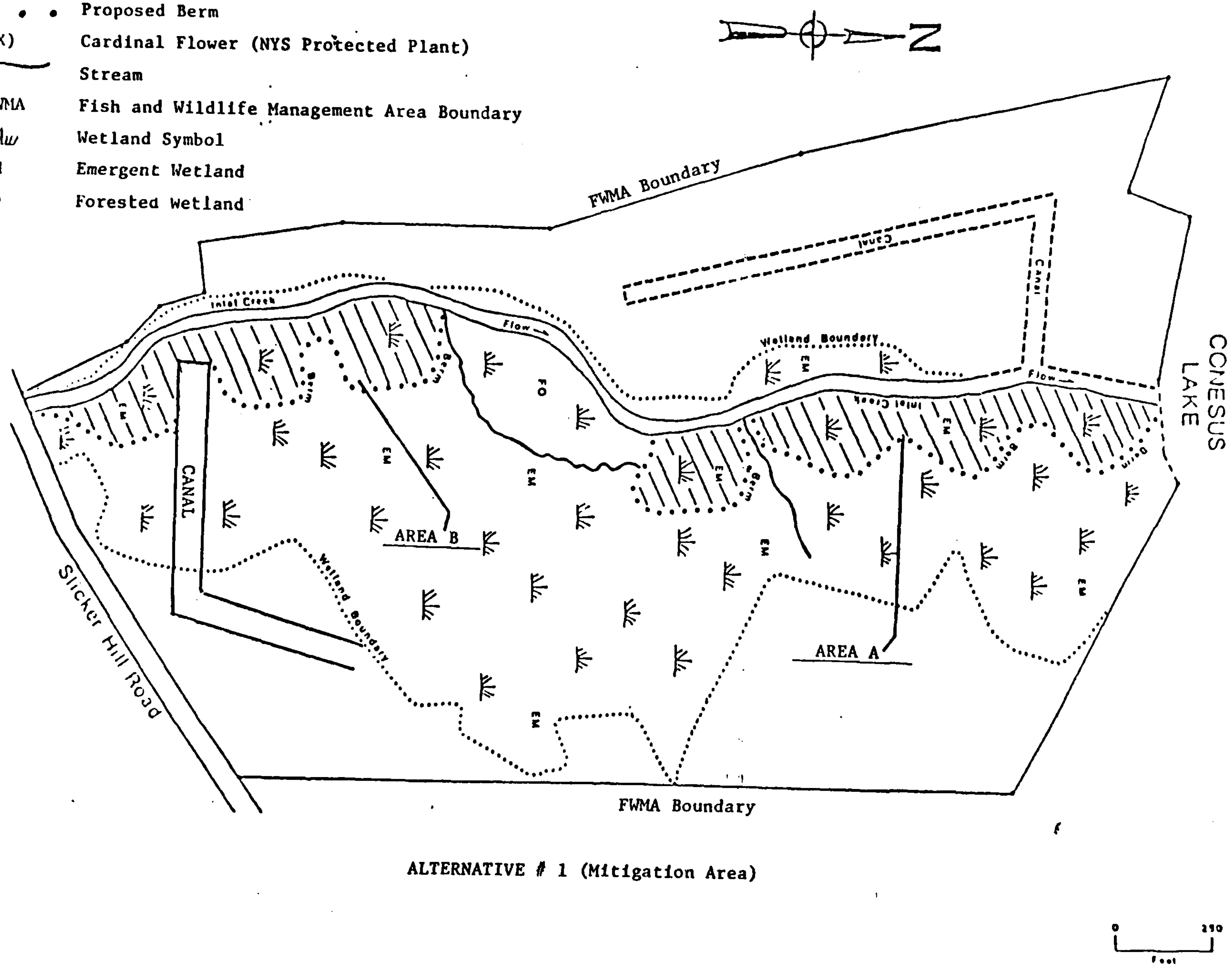
U.S. ARMY ENGINEER DISTRICT, BUFFALO



PRESENT PROPOSED MITIGATION AREA

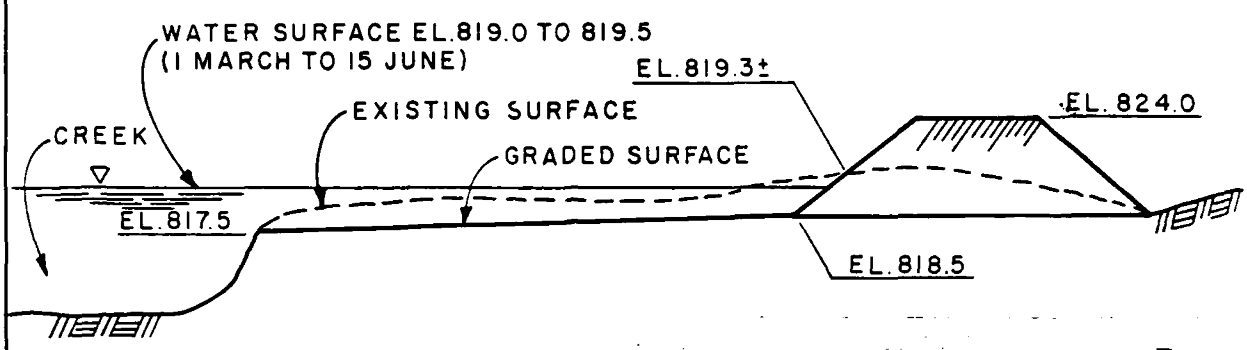
LEGEND

• • •	Proposed Berm
(X)	Cardinal Flower (NYS Protected Plant)
⟵	Stream
FWMA	Fish and Wildlife Management Area Boundary
ɯlɯ	Wetland Symbol
EM	Emergent Wetland
FO	Forested Wetland



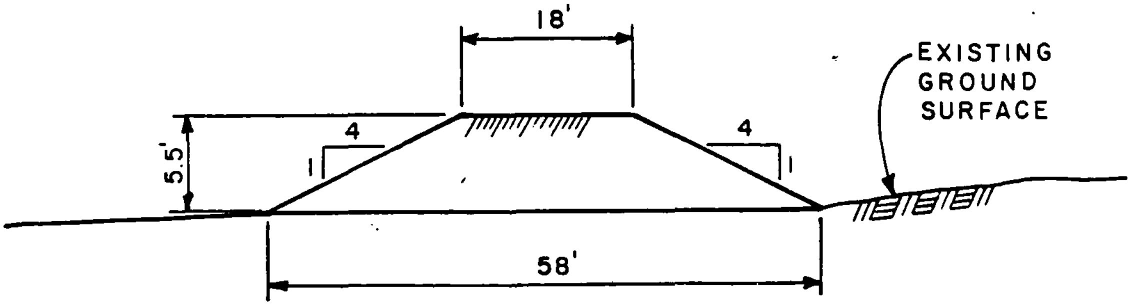
ALTERNATIVE # 1 (Mitigation Area)

PLATE 2



GRADED SECTION

NOT TO SCALE



BERM SECTION

NOT TO SCALE

TYPICAL BERM CROSS SECTIONS IN THE MITIGATION MEASURE

PRELIMINARY ASSESSMENT OF PROPOSAL IMPACTS
PERTINENT TO LAND USE, AGRICULTURE, AND DISPLACEMENT OF FARMS

(Note - Some sections extracted from the Corps of Engineers Preliminary Working Assessment, February 1981)

LAND USE

EXISTING CONDITIONS

a. Livingston County's land use patterns are dominated by agriculture which accounts for approximately 60 percent of the total. (This is about 10 percent less than in 1960.) Forest land comprises about 27 percent of the county's land use, leaving the remaining 13 percent of the county in water and wetlands, outdoor recreation, and urbanized areas. See Figure 1. (Livingston County's Land Use Analysis - 1971)

b. Two major land use trends may be noted for the county.

(1) Natural forest areas are generally restricted to hilltops, steep slopes, and gorges. Agriculture and urbanization have replaced natural forests in most level areas.

(2) All major urban areas are concentrated along the State highway system or, in the case of Conesus Lake, along a body of water. This urbanization is spreading out from existing centers along the highway and road network, often at the expense of agricultural land. See Figure 2. (Livingston County's Land Use Analysis - 1971)

c. The major land use categories represented in the Conesus Lake basin (see Figure 3) are: Active agriculture (50 percent), inactive agriculture (10 percent), forest cover (30 percent), and residential (2-3 percent). The remaining 7-8 percent of the basin is occupied by Conesus Lake itself. In the area immediately adjacent to the lake, the primary use of land is residential. This area contains over 2,000 homes and cottages and accounts for 80 percent of the basin's population. The major exception to this residential use is the marsh area at the southern end of the lake, which is managed by the New York State Department of Environmental Conservation as a fish and wildlife area. (Forest et. al., 1978).

d. Figure 4, based on the town of Livonia, Land Use Map, presents land use in the Conesus Creek outlet vicinity.

WITHOUT CONDITIONS (NO ACTION)

a. The major land use development that would be expected for Livingston County is continued urbanization. See Figure 2.

b. There is an adopted county comprehensive land use plan which is intended to guide the growth and development in the county. A rough estimate of the level of development can be made using the Livingston County year 2000 land use plan - the "DAN" Plan as a base. This is the plan which is intended

to guide development, and which reflects land use goals and policies of the county. The plan provides for "directing development (D) into areas best suited for intensified land uses, and maintaining very low development densities in the county's prime agricultural areas (A) and natural resource areas (N)" (Appendix B).

c. Each town in the vicinity of Conesus Lake also has adopted zoning ordinances which limit the kind of development that can occur in a given area. The zoning in the vicinity of the lake generally permits one or two-family units on the lake shore and on the land side opposite the road (each town has different zoning classifications - Appendix B).

d. The future land use in the Conesus Lake area is likely to remain much the same as at present, i.e., lake residential. Based on current zoning, the kinds of changes which are probable, include:

(1) Higher density development in some areas of the lakeshore, particularly those zoned for such densities, e.g. along the north shore of the lake in the town of Livonia.

(2) A combination of multi-family structures and "executive" type single family homes in the upland areas.

(3) Commercial development in the villages of Geneseo and Livonia and in Lakeville. (Much of this will be associated with the Genesee Expressway.)

(4) Upgrading and/or winterizing of present dwellings. (Appendix B)

e. Currently, zoning limits multiunit housing to eight units, for most lake property. This is a likely limit over the long term due to the constraints on available land. The limits on upland development will be governed by zoning, water supply, and the potential for affecting the ability of the land to absorb storm water, thus causing possible flooding in the gullies that drain into Conesus Lake and increasing the lake level. There will undoubtedly be strong pressures for higher intensity development at the lake. New construction and major remodeling on the lake shore will also be governed by the requirements of the Federal flood insurance program, in which all four towns are involved. (Appendix B)

f. Given present policy and attitudes of both the county and lake residents, it is unlikely that there will be commercial or industrial development on the lake shore or upland area, with the exception of the hamlet of Lakeville. Its location at the intersection of two State highways (Routes 20A and 15), both of which are on interchanges for the Genesee Expressway, make it an obvious location for development. In fact, there is currently a proposal before the planning board to rezone about 120 acres in the southwest quadrant of the intersection of Routes 15 and 256 from agricultural to commercial. This plan has been presented but the intended use is not known.

g. In 1967, in the Conesus Creek outlet area immediately adjacent to the lake (Dand Point, trailer park, vicinity) proposed plans were to construct a motel, restaurant, and recreation area. "To date, progress

toward this goal has consisted of clearing, filling, and installation of a steel breakwall to eliminate deteriorization of the shoreline." (Anderson 1976, CLA)

PROPOSAL EFFECTS

LAKE LEVEL REGULATION PLAN

a. Implementation of the Lake Level Regulation Plan would not be expected to significantly alter the types of land use from that anticipated under "Without Conditions." Resulting flood damage reduction, however, would be expected to stimulate both improvements to existing structures and possibly, new development in previously designated hazardous areas.

STRUCTURAL (PLAN 30-60A OR PLAN 30-60, AND DOWNSTREAM TO ROUTE 256)

a. Either of the alternatives would require some land acquisition and easements for the construction and maintenance of control facilities. Although several trailers would need to be repositioned and lake access issues would need to be addressed, it is not anticipated that significant land use changes would occur. See Figure A.

b. The 30-60A Plan alinement would follow the existing channel. Improved channel dimensions and necessary easements would require acquisition of approximately 2.3 acres of land along the Conesus Creek Outlet in the reach from the lake to the Route 20A Bridge. This alternative would also necessitate the relocation (or repositioning) of an estiamted 5 to 13 trailers and associated facilities, and two cottages. Those affected would be the trailers and cottages situated along the existing outlet. Adequate room to pull the trailers further into the park is questionable. Significant modification to facilities near the private road bridge would also be necessary (utilities, the bridge, sheet piling). Small-boat access to the lake by way of the Conesus Creek Outlet would be improved because of deeper water upstream of the new control structure.

c. The 30-60 Plan would incorporate construction of a new channel from the lake through the trailer park. This new channel combined with the existing channel allows for utilization of both the existing and new channel capacities, which significantly reduces land acquisition and relocation requirements. Improved channel dimensions and easement requirements would necessitate acquisition of approximately 1.9 acres of land in the reach between the lake and the Route 20A Bridge. Construction of the new channel cut through the trailer park would physically sever the trailer community, as well as require the relocation (repositioning) of an estimated seven trailers, including three-with immediate lakefront access. Although designation of new sites would primarily be the responsibility of the land owner, there appears to be adequate room in the trailer park for relocation of trailers. A footbridge would be constructed to maintain pedestrian access over the new channel, and an access road provided from the west to maintain vehicular access. Since the control structure would be located near the Route 20A Bridge, Conesus Creek and the new channel would be subject to lake level stages from the lake up to the control structure. Small-boat access to

the lake by way of the creek and new channel would be improved. (The footbridge would be constructed high enough to provide boat access.)

d. The reach downstream from the Route 20A Bridge: (See Figures 5 and 10.)

(1) The existing channel would be modified to a 35-foot wide (bottom width) trapezoidal channel, with 1 vertical to 3 horizontal sideslopes; from the Route 20A Bridge to a location (just below the sewage treatment plant) about 5,000 feet downstream from the Route 20A Bridge.

(2) The improved channel would follow the existing channel alignment as much as practical. Minor deviations from this alignment would occur to avoid or minimize the need to relocate sewer and water facilities which cross under or are near the creek. Most of the channelization and excavation work would occur along the west bank. This would preserve the existing riparian vegetation along the east bank and minimize adverse impacts to the residential properties that exist between the creek and Rochester Road;

(3) Approximately 44,000 cubic yards of material would be excavated by bulldozer or dragline from the west bank for this reach (from the Route 20A Bridge to the sewage treatment plant vicinity). The material excavated would be distributed and graded in low areas along the west bank of the creek. This material has been tested in 1981 and determined to be nonpolluted when compared to the "National Primary Drinking Water Standards."

(4) The excavated embankments would be revegetated with woody and/or herbaceous plantings soon after construction to minimize erosion and to reestablish riparian vegetation, wildlife habitat, and stream cover;

(5) Acquisition of approximately 8 acres of land would be required along the west bank in this reach. This would provide an approximate 25-foot wide strip of land along the entire bank to provide room for construction and permanent easements. Access would be provided at/from the sewage treatment plant. About 3 acres of this land consists of present in-stream acreage.

e. Land acquisition and relocation would occur pursuant to the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970," Public Law 91-646, which provides for the fair market value of property, moving expenses, supplemental housing payments, and other compensation.

AGRICULTURE AND DISPLACEMENT OF FARMS

EXISTING CONDITIONS

a. New York State recognizes the Genesee Finger Lakes Region to be one of the most important farm areas within the State. Livingston County leads the other seven counties in the region in percentage of land devoted to extensive agriculture. The northern towns of Avon, Caledonia, Geneseo, Lima, Livonia, and York are the agricultural leaders in the county. (Livingston County Planning Board - Land Use Inventory and Analysis - 1971).

b. Livingston County's land use patterns are dominated by agriculture which accounts for approximately 60 percent of the total. (This is about 10 percent less than in 1960.) The acreage and level of agricultural use has remained extraordinarily stable and a balance is still being maintained between areas put into and taken out of cultivation (1970). In 1969, the average farm had been held by the owning family for 40 years. Consolidation has reversed slightly: more farms (all farms) with smaller acreage are indicated - the direction is contrary to the State trend where commercial farms continue to decline in number and increase in average size. Meanwhile, the increase in farm value in Livingston County significantly exceeds the State gain. Apparently, here there are buyers who find farming attractive as investments or as a style of living. (Forest et. al., 1978) The principal products of today are recognizable from 1860 (Forest 78); those principal sources of income being: (in 1969) dairy products (48 percent), field crops (22 percent), and livestock products (17 percent). (New York State, Basic County Statistics, 1970)

c. In the Conesus Lake vicinity, the U.S. Department of Agriculture - Soil Conservation Service - Important Farmland Map (August 1977) indicates more than 75 percent prime farmland area north and east of the lake and; greater than 25 percent land of Statewide importance, but less than 25 percent prime farmland south and west of the lake. Reference Figure 8.

d. The immediate lake perimeter and the east bank of Conesus Creek (along Route 15 between Route 20A and Route 256) are residentially well developed. Reference land use material. The area immediately west of Conesus Creek (from Route 20A to Route 256) and small fields immediately east of the creek appear to be the only riparian areas of possible agricultural activity in the project vicinity. Figure 4, based on the town of Livonia, Land Use Map, presents land use in the Conesus Creek outlet vicinity. Although potential agricultural lands border the creek along the west bank in the reach between the Route 20A bridge and the sewage treatment plant, only about 1,000 feet bordering the creek is identified as active agricultural land.

e. The Livingston County Planning Board has identified two properties in the Conesus Creek outlet vicinity as being included in Livingston County's specifically-designated agricultural districts. Those properties are included in Livingston County's Agricultural Districts No. 2 and 13. See Figures 6 and 7. The districts are identified primarily so that the maintenance of viable farming may be encouraged in the designated areas.

f. The Livingston County soil survey map of this vicinity (U.S. Department of Agriculture Series 1941, No. 15), indicates that soils immediately along the Conesus Creek outlet consist of, and include primarily: Alluvial soils, Arkport fine sandy loam, Berrien fine sand loam, Lakemont silty clay loom, Odessa silt loam, Schoharie silty clay loom, and Wayland silty clay loam. Soil survey map symbols (Ab, Ad, Be, La, De, Sc, Sk, Wc). See Figure 9. Of these, the Arkport fine sandy loam (Ad) and the Berrien fine sand loam (Be) are included as Livingston County, New York - Prime Farmland Mapping Units. See Attachment 1. These soil areas are also indicated on Figure 9.

WITHOUT CONDITIONS (NO ACTION)

a. Agricultural activity in Livingston County and the Conesus Lake region will continue to be important at the local, county, regional, and State level. The most pressing concern is urbanization - development at the expense of agricultural land. Several legislative and planning efforts have been enacted to abate this trend. The Livingston County "DAN" land use plan is a prime example. It provides for "directing development" into areas best suited for intensified land uses and maintaining very low development densities in the county's prime agricultural and natural resource areas.

b. The specific designation of agricultural districts is also intended to preserve and encourage the maintenance of viable farming in the designated areas.

c. The Conesus Lake vicinity has been identified as an urbanizing area by Livingston County, and additional developmental pressures are anticipated with completion of the Genesee Expressway. Although enforcement of previously-mentioned measures will help to alleviate the problem, it is anticipated that in the future, more agricultural lands will succumb to increased developmental pressures.

PROPOSAL EFFECTS

LAKE LEVEL REGULATION PLAN

a. No apparent significant agricultural activity occurs along the perimeter of Conesus Lake, and no displacement of farms or significant adverse impacts to agricultural activity would be anticipated as a result of implementation of the lake level regulation plan.

STRUCTURAL PLANS (PLAN 30-60A OR Plan 30-60, AND DOWNSTREAM TO ROUTE 256)

a. The area along the Conesus Creek outlet between the lake and Route 20A is not utilized for agricultural purposes. The only areas that were, or are being utilized for agricultural purposes that could possibly be impacted upon by implementation of the structural plans are: (1) along the west bank of the Conesus Creek outlet from the village of Lakeville to the Millville Dam and (2) along the east bank of the outlet from the sewage treatment plant vicinity to the Millville Dam (Route 256). Reference Figure 4.

b. The actual modification to the Conesus Creek outlet in the reach between the Route 20A bridge and the Route 256 bridge (Millville Dam) would consist of increasing the existing channel bottom width (already about 25-feet wide) to a 35-foot channel bottom width with 1 vertical to 3 horizontal side slopes. The actual area of stream modification, therefore, would consist of a strip of land about 15 to 20 feet wide and 5,000 feet long along the west bank. An additional 5 to 10 feet of permanent easement would be maintained along the improved bank to provide access for maintenance. The material excavated would be graded and seeded within a proposed 25-foot corridor along the improved west bank in compliance with easement and property owner agreements. Utilization of this corridor would be temporary. Only the

permanent easement corridor (5 to 10 feet wide) along the improved creek bank would be permanent. See Figures 5 and 10.

c. With respect to drainage, concerns often pertain to variations in discharge and water levels. Hydrological and hydraulic investigations show, however, that for this project (particularly relative to project scale) these effects would not be significant. Consideration is also given so that no impediment would be created which would result in the disservice of existing subsurface drainage lines. Any depositing of soil from the bank modifications and dredgings on agricultural lands would be done in such a manner as to retain natural or existing drainage characteristics, and in a manner as agreed upon/indicated by the respective landowners/operators. This would be determined in negotiations for land and easements and would be developed in more detail in finalization of plans and specifications. Disturbed banks would be promptly fertilized, seeded, and mulched to reduce potential erosion.

d. It is noteworthy to mention that some soil areas identified as prime farmland units are occupied by the outlet trailer park, homes/businesses, and the Lakeville sewage disposal plant. In addition, several thousand feet in the vicinity of the west bank have been previously disturbed by the installation of the sewer line. See Figure 5. The sketch (reference Figure 4) also indicates that only about 1,000 feet of active agricultural land closely parallels the creek in the construction vicinity.

e. Agriculture is an important issue in the region and vicinity, but since the necessary modification to the stream in these vicinities is not extensive, no significant adverse impacts to agricultural activities, lands, or displacement of farms would occur.

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(1) N.Y.S. Prime Farmland Map 1977.

(2) N.Y.S. Important Farmland Map 1976.

(3) Livingston County Soil Survey Report
Series 1941, No. 15
Issued 1956
Maps Dated 1955

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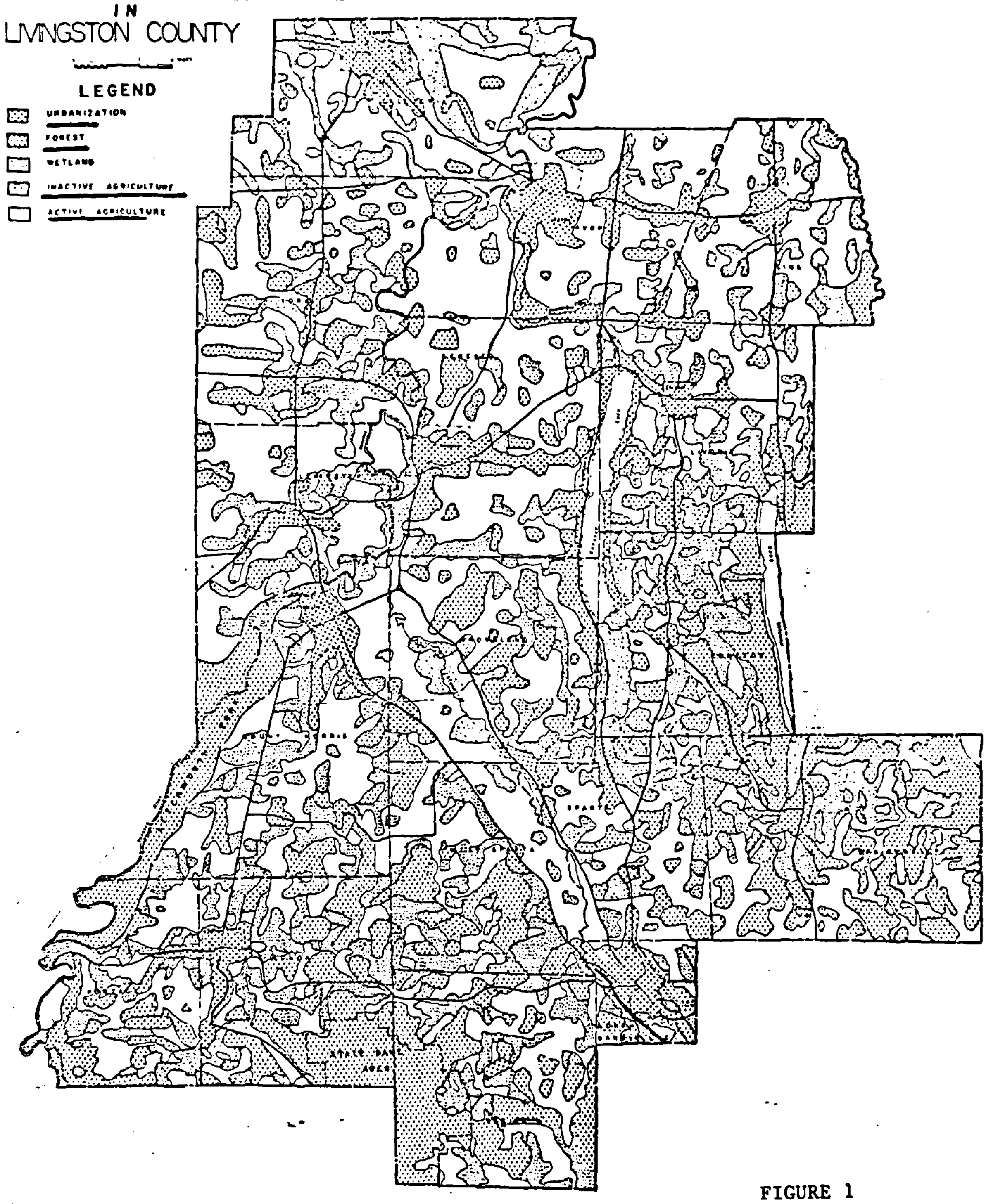
GENERAL LAND USE IN LIVINGSTON COUNTY



Source: Land Use Inventory and Analysis.

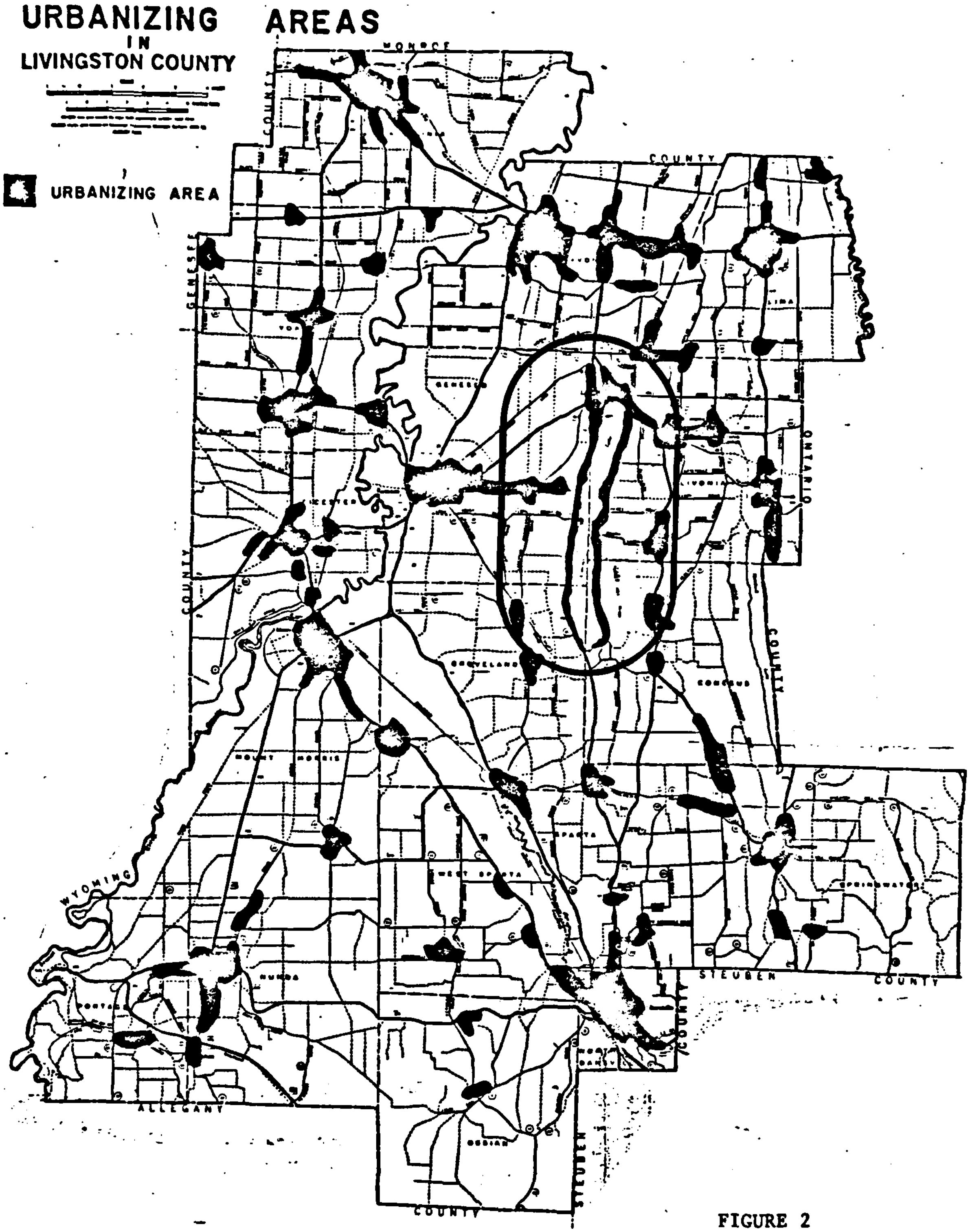
Livingston County Planning Board, 1971

FIGURE 1

CONESUS LAKE, NEW YORK

LIVINGSTON COUNTY
LAND USE

U.S. ARMY ENGINEER DISTRICT, BUFFALO



Source: Land Use Inventory and Analysis
Livingston County Planning Board, 1971

FIGURE 2

CONESUS LAKE, NEW YORK

LIVINGSTON COUNTY
URBANIZING AREAS

U.S. ARMY ENGINEER DISTRICT, BUFFALO

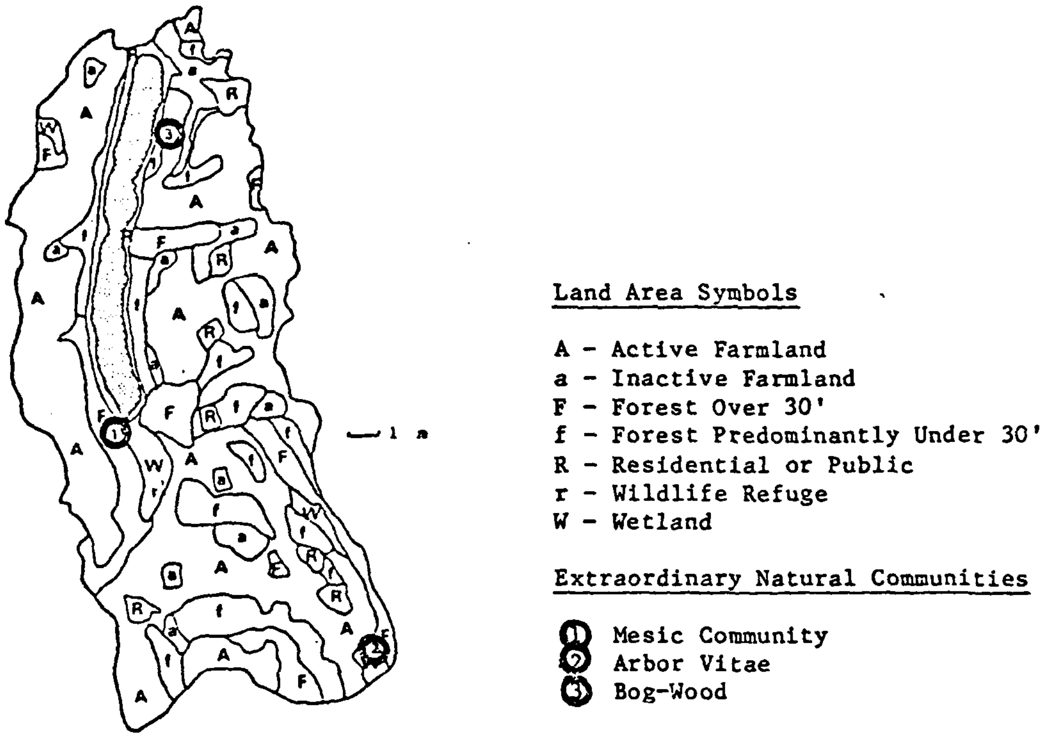


Figure I - Conesus Lake Watershed Land Use Map (Forest et. al., 1978)

FIGURE 3

CONESUS LAKE, NEW YORK

CONESUS LAKE BASIN

LAND USE

U.S. ARMY ENGINEER DISTRICT, BUFFALO

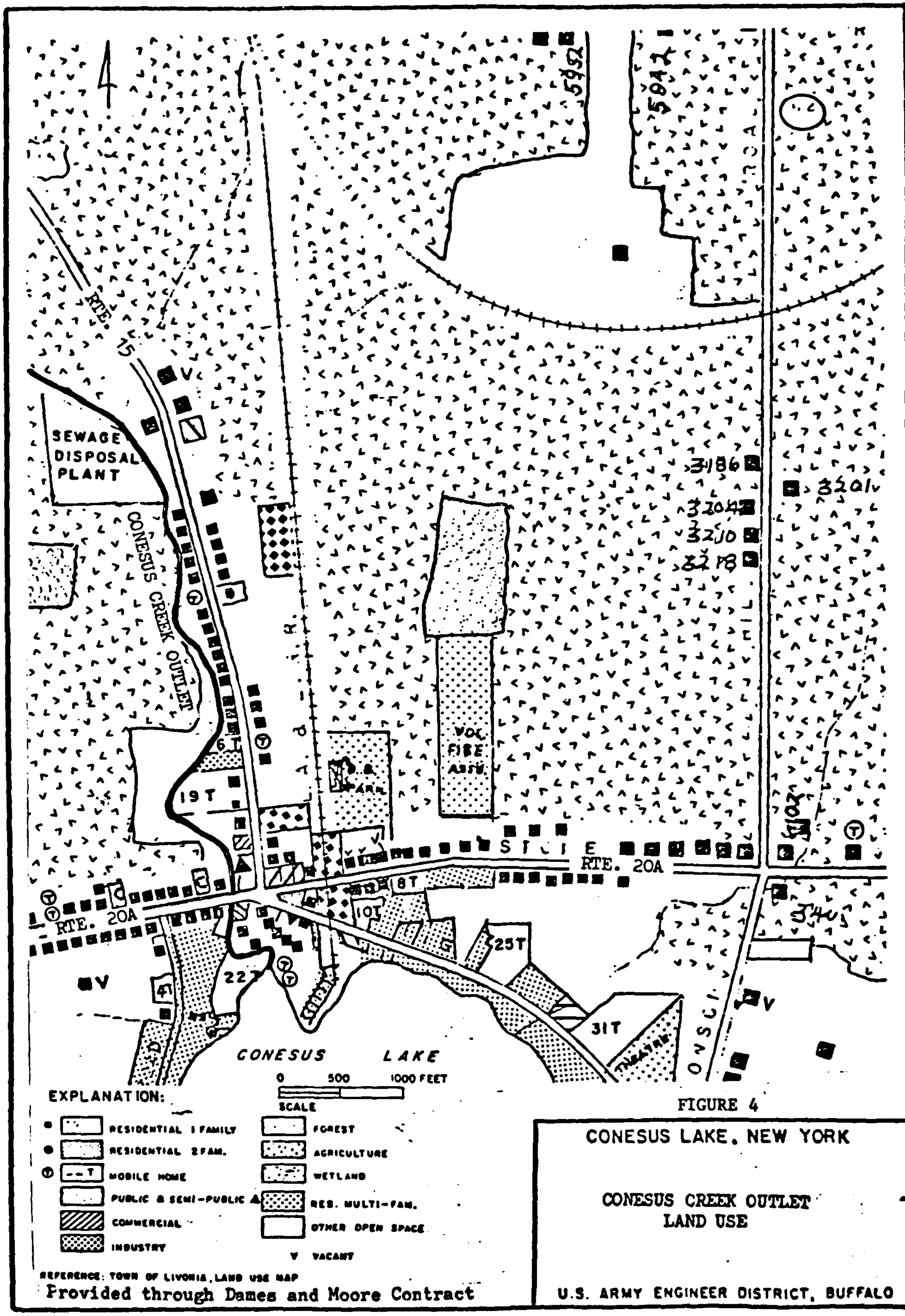


FIGURE 4

CONESUS LAKE, NEW YORK

CONESUS CREEK OUTLET
LAND USE

U.S. ARMY ENGINEER DISTRICT, BUFFALO

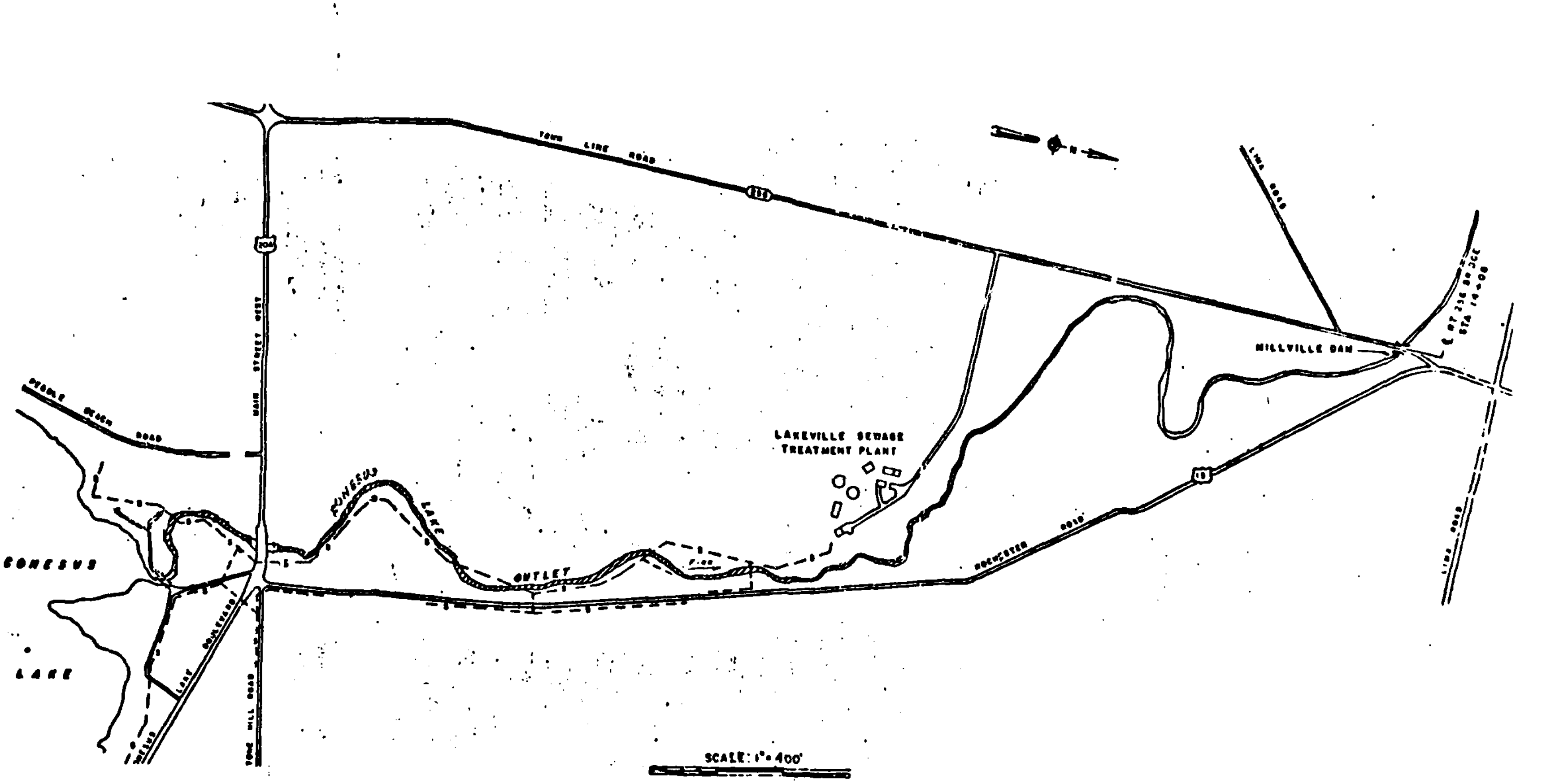


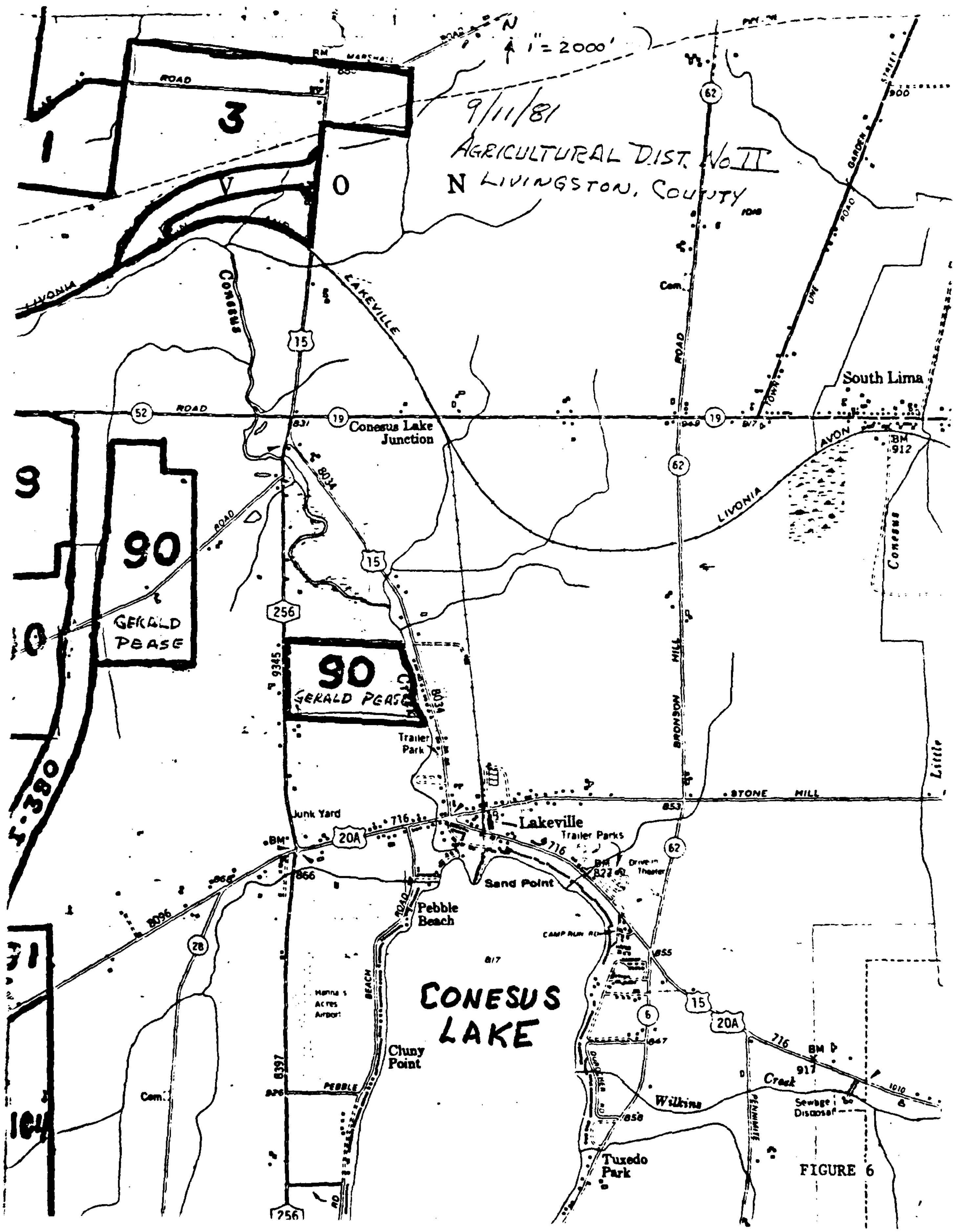
FIGURE 5

CONESUS LAKE, NEW YORK

EXISTING PROJECT

CONSTRUCTION VICINITY

U.S. ARMY ENGINEER DISTRICT, BUFFALO



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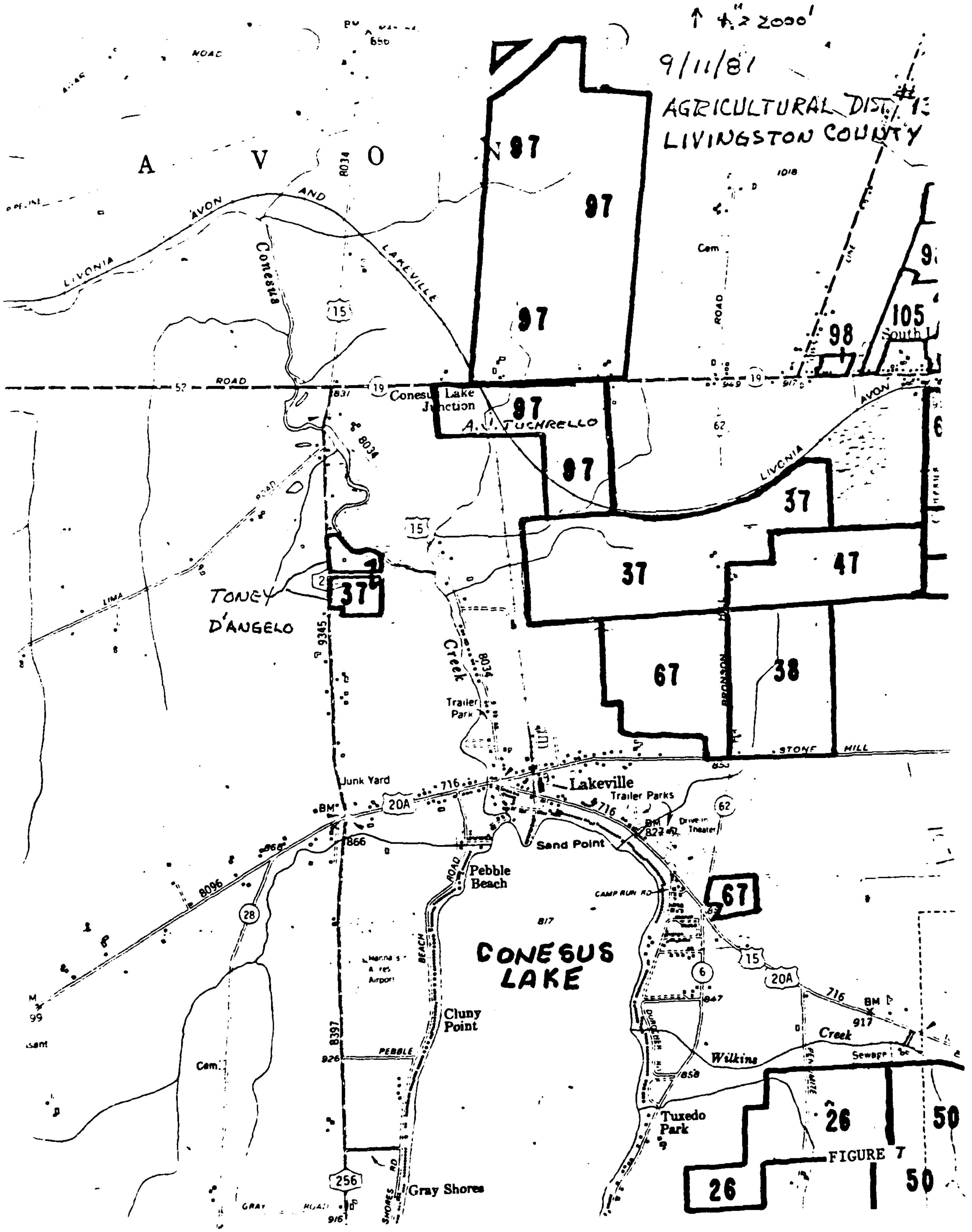
South Lima
Lakeville
Trailer Parks
Trailer Park
Junk Yard
Sand Point
Pebble Beach
Cluny Point
CONESUS LAKE
Tuxedo Park
Drive-in Theater
Sewage Disposal
Wilkins Creek
LIVONIA
LAKEVILLE
BRONSON HILL ROAD
STONE HILL
AVON LIVONIA
Conesus
Com.

FIGURE 6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A. J. TUCHRELLO
TONEY D'ANGELO
Conesus Lake Junction
Lakeville
Trailer Parks
Sand Point
Pebble Beach
CONESUS LAKE
Cluny Point
Gray Shores
Tuxedo Park
Junk Yard
Trailer Park
Drive-in Theater
Wilkins Creek
Sewage
Cem
Conesus
Creek
LIVONIA AVON AND LAKEVILLE
LIVONIA AVON
BRONSON
STONE HILL
CAMP RUN RD
PEBBLE
GRAY ROAD
BEACH
SHORES RD
LIMA ROAD
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62
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8034
8096
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FIGURE 7

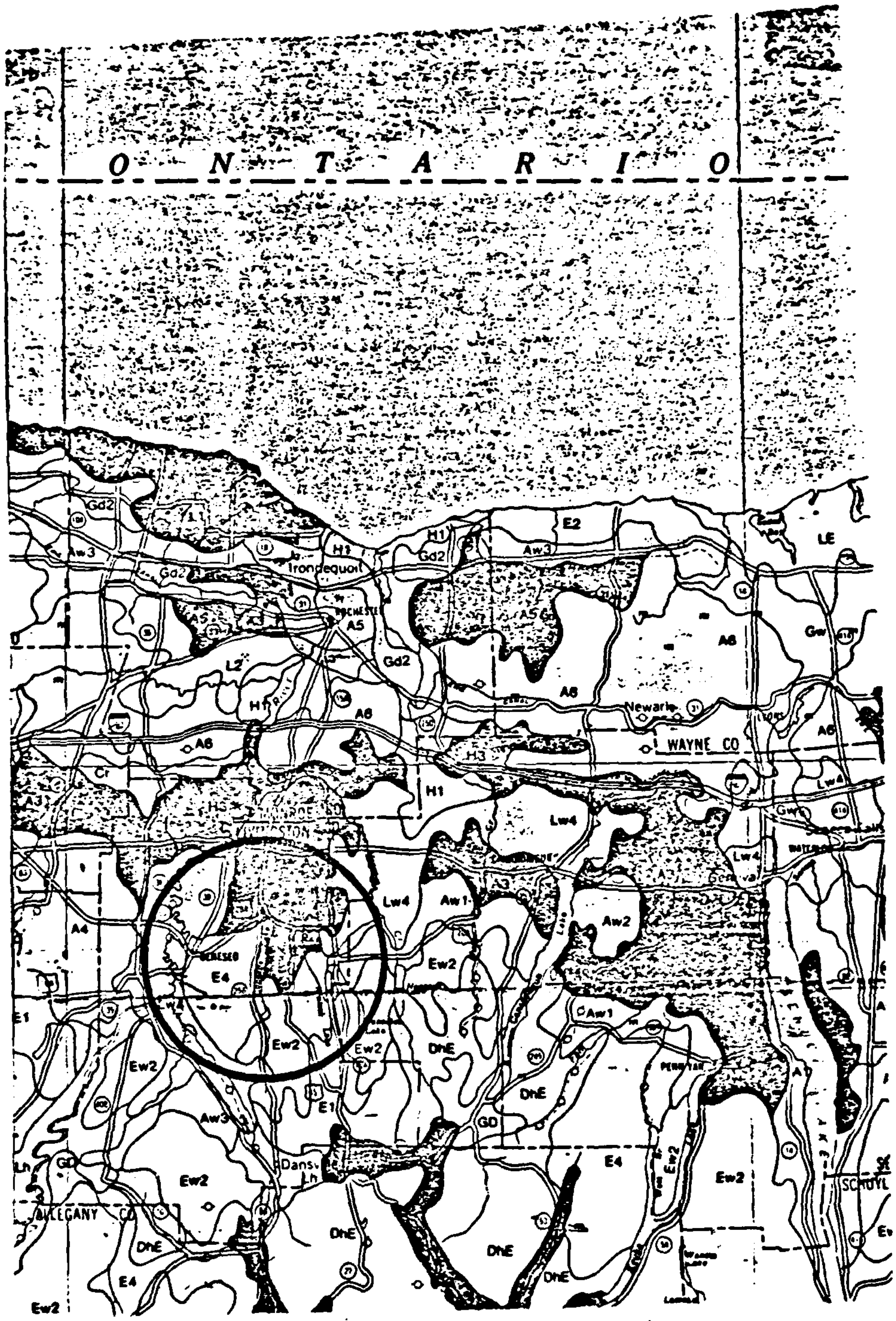


FIGURE 8

More than 75% prime farmland

CONESUS LAKE, NEW YORK

NEW YORK STATE
PRIME FARMLANDS

Source: New York State-Prime Farmland Map 1977
U.S. Dept. of Agriculture-Soil Conservation Service

U.S. ARMY ENGINEER DISTRICT, BUFFALO

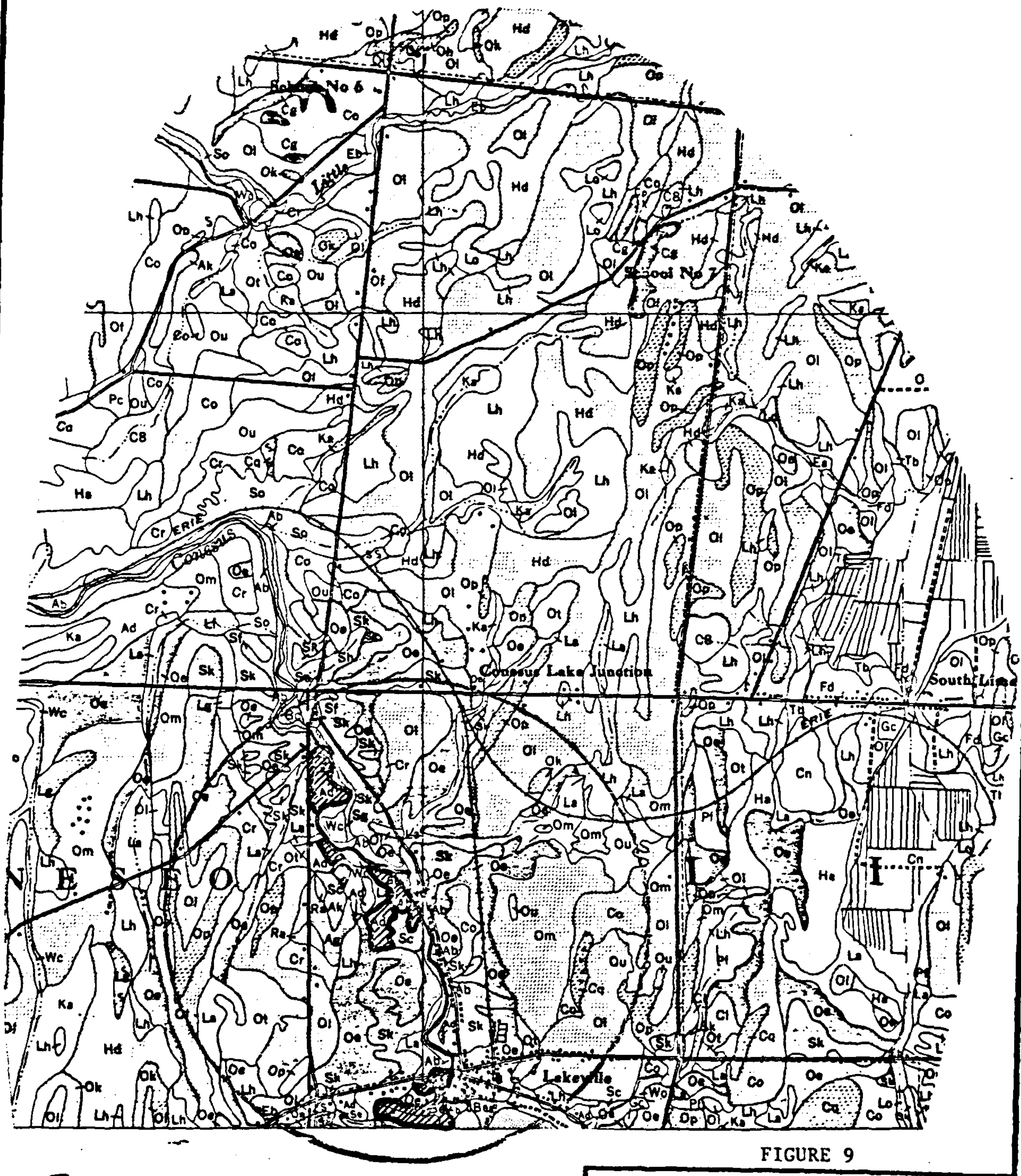


FIGURE 9

Prime Farmland - Mapping Units

Source: Livigston County Soil Survey, 1971

CONESUS LAKE, NEW YORK

CONESUS CREEK OUTLET SOILS MAP

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Rec'd 10/80

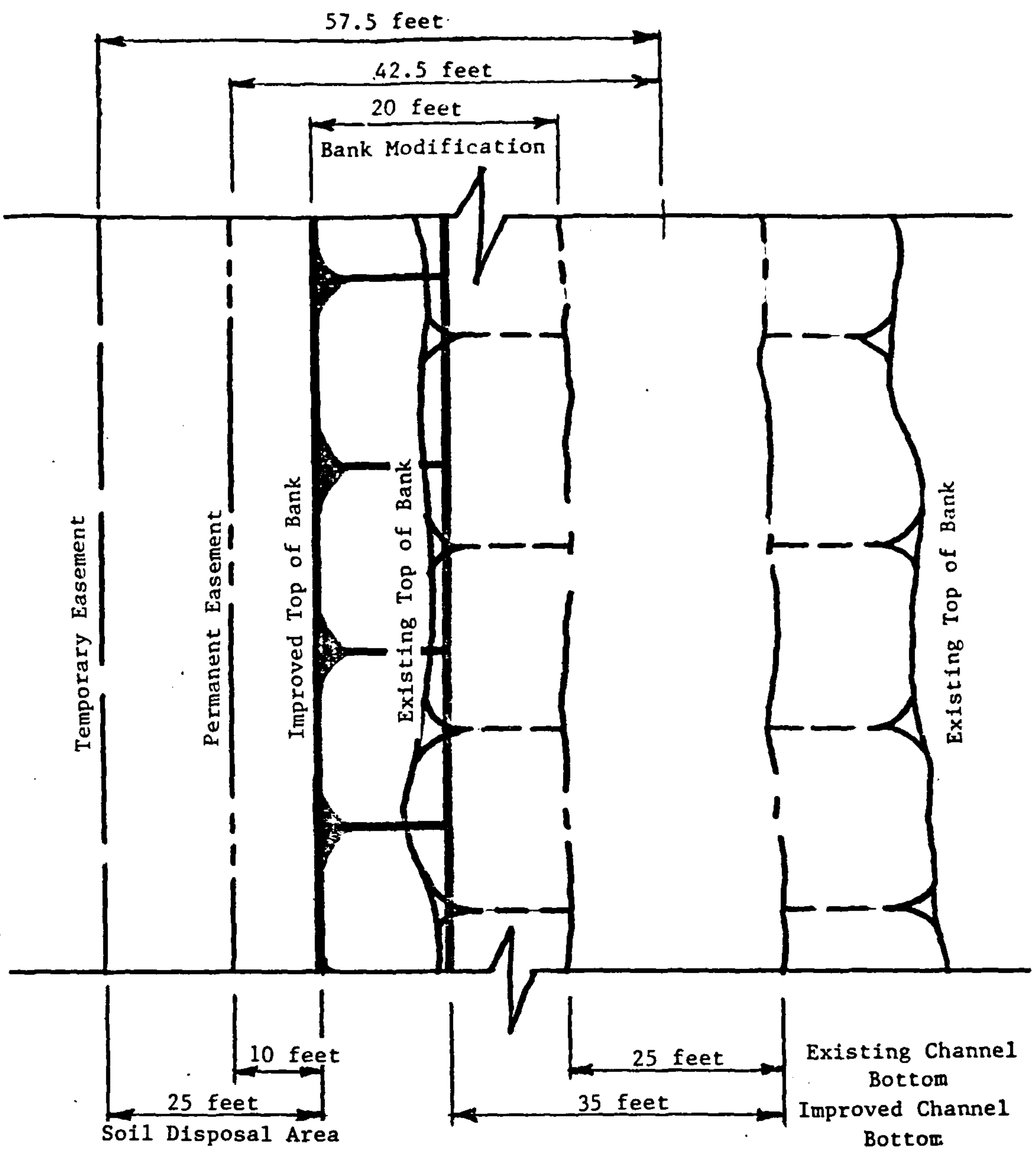
LIVINGSTON COUNTY, NEW YORK

PRIME FARMLAND - MAPPING UNITS

Ad - Arkport fine sandy loam, gently undulating phase
Be - Berrien fine sandy loam, gently unulating phase
Bf - Braceville silt loam
Co - Cayuga silt loam, gently sloping phase
Cr - Cazenovia silt loam, gently sloping phase
Cw - Chagrin silt loam
Cx - Chagrin silt loam, high-bottom phase
Cu - Chagrin fine sandy loam, high-bottom phase
Cv - Chagrin shaly silt loam, alluvial fan phase
C3 - Chenango gravelly loam, nearly level phase
C2 - Chenango gravelly loam, alluvial fan phase
Cy - Chenango fine sandy loam, nearly level phase
C9 - Conesus silt loam, gently sloping phase
Eb - Eel silt loam
Ec - Eel silty clay loam
Ga - Genesee fine sandy loam
Gb - Genesee silt loam
Ha - Hilton gravelly loam, 0 to 8 percent slopes
Hd - Honeoye loam, gently sloping phase
Hh - Howard fine sandy loam, nearly level phase
Hl - Howard gravelly loam, nearly level phase
Ka - Kendaia silt loam
Le - Lansing silt loam, gently sloping phase
Lh - Lima silt loam, gently sloping phase
Mg - Mentor fine sandy loam
Mh - Middlebury silt loam
Of - Ontario fine sandy loam, gently sloping phase
Ol - Ontario loam, gently sloping phase
Om - Ontario loam, gray subsoil phase
Pa - Palmyra fine sandy loam, nearly level phase
Pc - Palmyra gravelly loam, nearly level phase
Pd - Palmyra gravelly loam, sloping phase
Rd - Ross silt loam
Ta - Tioga silt loam
Tc - Tuscarora sandy loam
Vb - Valois gravelly loam, rolling phase
Wh - Woostern gravelly loam, undulating phase

Livingston

ATTACHMENT 1



	Land Requirements		Active Agricultural Lands	
Permanent Construction Effects	(30 by 5000)	(3.4 acres)	(30 by 1000)	(.7 acres)
Temporary Construction Effects	(45 by 5000)	(5.2 acres)	(45 by 1000)	(1.0 acres)

PRELIMINARY

FIGURE 10

LIMESTONE CREEK, NEW YORK

CHANNEL BANK MODIFICATION

U.S. ARMY ENGINEER DISTRICT, BUFFALO

Easement Requirements		
Permanent	(42.5 by 5000)	(4.9 acres)
Temporary	(15 by 5000)	(1.7 acres)

Approximate Total (6.6 acres)

SUMMARY OF THE MITIGATION PLAN

In order to mitigate for loss of some northern pike wetland spawning/nursery habitat anticipated from implementation of the proposed lake level management plan, the Corps coordinated with the U.S. Fish and Wildlife Service (USFWS) and New York State Department of Environmental Conservation (NYSDEC), to develop a mitigation plan on the "Ames Parcel" wetland now owned by NYSDEC at the southern end of Conesus Lake, north of Slicker Hill Road on the east side of Inlet Creek, in Livingston County, New York. The plan was developed in accordance with recommendations outlined in the Final Fish and Wildlife Coordination Act Report prepared by the FWS at Cortland, New York, through meetings held with FWS and NYSDEC biologists in Avon, New York, on 28 March 1980, 23 May 1980, and 1 September 1981, and through telephone communication with both the aforementioned agencies. Under existing conditions after initial spring flooding, the wetland usually becomes drier after Conesus Lake levels recede, thereby trapping and killing northern pike fish eggs and newly-hatched fry. Essentially, the wetland would be shallowly scalped, graded, and revegetated to provide for more potentially-dependable water inundation over about 10 acres of wetland spawning/nursery fish habitat during the spring season. This mitigative measure is intended to grade the wetland so that at the new proposed target elevation of 819.0, the wetland would contain approximately 6 inches to 18 inches of water for pike spawning; also, it would more likely enable hatched fry to follow lake water recession without becoming trapped in potholes. Briefly, the mitigation plan is as follows:

Approximately 13.5 acres of existing wetland would be modified. Of this total amount, about 10 acres would be shallowly scalped and graded; about 3.5 acres would be covered by a trapezoidal berm 5 feet high with a base width of around 58 feet and, side slopes of 1 foot vertical to 4 feet horizontal. The berm's top width will be about 18 feet wide. Refer to Appendix E, Section 404 Evaluation on Wetland Mitigation, Plate 1, for location of the 10-acre NYSDEC wetland portion of the project zone; also, see Appendix E for plate entitled Typical Berm Cross Section in the Mitigation Plan.

Some small "islands" of existing vegetation would be left within the project zone, to allow for habitat diversity and to serve as a natural woody/herbaceous vegetation seed source in the vicinity of scalped/graded areas. In order to help restore the disturbed project portion back to its grassy vegetative condition as much as practical and possible, the graded portion would be seeded to adaptable vegetation (such as reed canary grass) as soon as scalping and grading has been accomplished and, as soon as the soil has had a chance to dry out to some degree to make seeding possible. A tentative proposal to accomplish seeding would be some time during July through September.

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STAGE III DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STAT--ETC(U)
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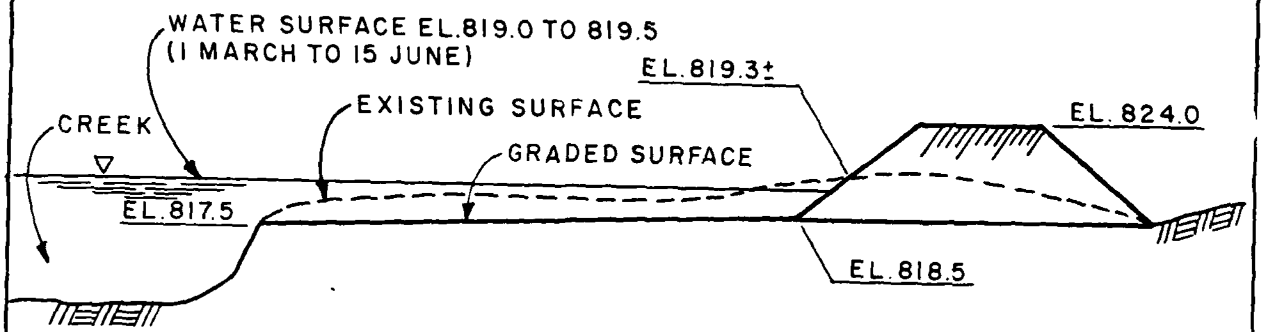
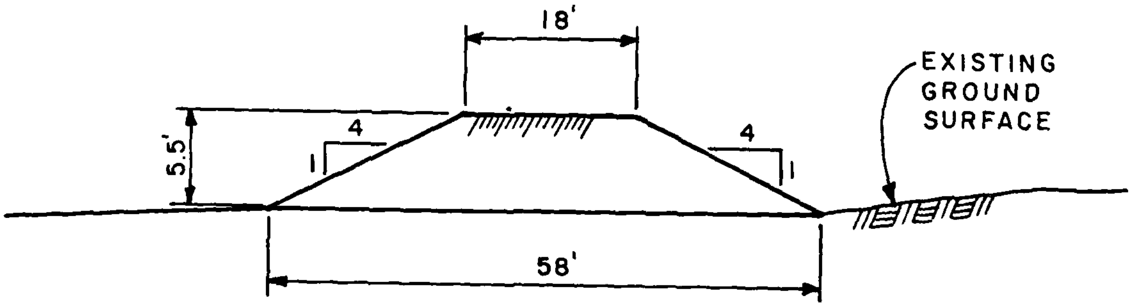


GRADED SECTION

NOT TO SCALE



BERM SECTION

NOT TO SCALE

TYPICAL BERM CROSS SECTIONS IN THE MITIGATION MEASURE

BRIEF INSTITUTIONAL SURVEY

CONESUS LAKE INSTITUTIONAL ANALYSIS

GENERAL

In order to provide some insight into the institutional framework of organizations concerned with Lake Level Management of Conesus Lake and all the parameters that lake level management encompasses, (e.g., environment, water supply and quality, public recreation, etc.), a brief institutional analysis is presented. This analysis describes each Federal, State, Regional, County, and local organizations, its relationship with others, and its specific input into lake level management and water resources planning. In many cases, the organization/groups discussed serve many functions. The comments here are limited to those functions related to lake level management and water resources planning.

FEDERAL GOVERNMENT

a. Soil Conservation Service - Department of Agriculture. The U. S. Soil Conservation Service assists individual landowners and users and units of Government with planning and installing conservation practices, with onsite planning of soil and water-related problems, and with soil interpretations for land use.

b. U. S. Geological Survey (USGS). The USGS is responsible for data gathering and recording aspects of stream flow data.

c. U. S. Army Corps of Engineers (Buffalo District). Responsible for flood control, navigation, and beach erosion control projects in an area that covers northern Ohio, a portion of northwestern Pennsylvania, and western, central, and northern New York. As part of its many responsibilities, the Corps maintains Rochester Harbor (Charlotte), operates Mount Morris Dam, and is currently engaged in a recreational navigation project for Irondequoit Bay.

d. Heritage Conservation and Recreation Service. Responsible for allocating grants for local recreation projects. The grants given to the State of New York are administered by the State Parks and Recreation Department.

e. U. S. Environmental Protection Agency. Administers and enforces Federal pollution control programs on a national and international basis.

f. Federal Insurance Administration and Office of Flood Insurance (HUD). The Federal Administration is responsible for administering National Insurance Flood programs. This includes establishing and mapping the limits of the floodprone areas within the limits of the towns and villages.

g. Fish and Wildlife Service, Department of the Interior, Division of Ecological Services. Responsible for all service review and comment relating to the Fish and Wildlife Coordination Act throughout the State of New York.

STATE OF NEW YORK

a. New York State Department of Environmental Conservation (Region 8) (NYSDEC). The NYSDEC covers an 11 county region consisting of Chemung, Schuyler, Yates, Seneca, Wayne, Ontario, Steuben, Livingston, Monroe, Genesee, and Orleans Counties. Divisions of air resources, pesticides, pure waters, solid waste, community relations, fisheries, wildlife, regional attorney, environmental analysis, forestry, land acquisition, water resources planning, and law enforcement. The DEC is funded by appropriation of the State Legislature. The DEC is the permit issuing department under Parts 15 and 24 (Stream Disturbance and Wetlands) of the Environmental Conservation Law.

what kinds of plans

b. New York State Clearinghouse. The New York State Clearinghouse serves to advise groups and agencies of the plans of others. The objective is to avoid duplication of effort or interferences between groups. Administratively, the Clearinghouse is under the Division of the Budget.

c. New York State Department of Transportation (NYSDOT). NYSDOT is funded through appropriation of State Legislature. The DOT has the responsibility for planning, construction, and maintenance of the State Highway System. Further, it is responsible for certain State waterways.

which?

d. New York State Department of Parks and Recreation. This department is funded through appropriation by the State Legislature and is responsible for the creation and maintenance of the State Park System.

e. New York State Health Department. Generally, this department is responsible for approving, regulating, and monitoring public water supply, distribution, and storage facilities throughout the State.

f. Environmental Protection Agency (EPA). EPA's purpose is to set and enforce environmental standards, to conduct research on the causes, effects, and control of environmental problems and to assist State and local Governments.

REGIONAL

a. Genesee/Finger Lakes Regional Planning Council. This group is an advisory group for the eight-county area consisting of Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, and Yates Counties in connection with land use and development. Funding is established through the various county members.

b. Genesee Valley Environmental Association. The Association supports the establishment of parks and recreation commission, first county park, environmental workshops, and bicycle routes.

c. Genesee Transportation Council. A group appointed by the Governor, includes elected and appointed members from an eight county region; provides the framework within which overall transportation planning is carried out for the eight county region.

d. Environmental Resource Center, State University College at Geneseo. The Center does workshed studies in the Finger Lakes and Lake Ontario bays. It does Environmental Impact Assessments and ecological surveys for public agencies and private clients.

e. Center for Environmental Information, Inc. The Center serves as a coordinate for environmental information and education in Rochester and the Finger Lakes region.

LIVINGSTON COUNTY

"The entire Conesus Lake Watershed is located within Livingston County. A Board of Supervisors is the usual governing and legislative body in a county. A County Board of Supervisors consists of at least one Supervisor from each town. The presiding head of a Board of Supervisors is the Chairman, who is elected by the Board members. Several counties have an elected County Executive who serves a chief adminstrative officer and shares policy-making powers with the Board through the power of veto." (Genesee River Basin Study V.IV Appendix G. p.76)

a. Livingston County Planning Board (LCPB). "The LCPB was established in May of 1967. The Board consists of 21 members, one from each of the 17 towns and four members chosen at-large. The Board is currently engaged in the development of a Comprehensive Plan for the county and is also involved in zoning review and local planning assistance. This Board is the only planning board in the county that maintains a fulltime staff. At present, the staff consists of a Planning Director, a Senior Planner, A Draftsman, and a Stenographer. Part-time help is also employed, usually through the Geography Department of the University at Geneseo." (LCPB: PLAN IMPLEMENTATION TOOLS, December 1973, p.3)

b. Livingston County Health Department (LCHD). "The LCHD is authorized and empowered to enforce several provisions of the NYS Sanitary Code.'... including...'inspection of all public water supplies; inspection of public swimming areas; inspection of temporary living units (mobile home parks, camps, motels, hotels, except those on public sewer lines), and public health nuisances..." (LCPB: PLAN TOOLS p.23)

c. Livingston County Soil Conservation Service (SCS) - U. S. Department of Agriculture. The SCS is responsible for carrying out a long-range program for the conservation of soil, water, and related resources. The District provides technical assistance to urban and rural land users to plan and implement measures for erosion control and water management. (Fredette: 1979)

d. Livingston County Cooperative Extension Association. County Cooperative Extension Associations are divided into three program areas: Agriculture and Related Industry; 4-H, Youth Development; and Home Economics.

e. Farmers Home Administration. A State funded agency that provides assistance for the development of rural water and sewer systems and provides farm and rural rental housing loans.

f. League of Women Voters of Livingston County. A nonpartisan lobby organization which studies issues and follows up with political action.

TOWNS, VILLAGES, AND HAMLETS

There are 12 Towns (T), Villages (V), and Hamlets (H) in the Conesus Lake Watershed.

Livonia (T), which includes Livonia (V), Lakeville (H), South Livonia (H), and Hemlock (H)

Geneseo (T), which includes Geneseo (V)

Conesus (T)

Groveland (T)

Springwater (T), which includes Webster Crossing (H)

Sparta (T)

A town is governed by an elected Town Board, presided over by the elected Supervisor, who also acts as the Town Executive and as the town's representative on the County Board of Supervisors. Towns are responsible for numerous local Governmental services, such as road construction and maintenance. The revenue to support these Governments comes mainly from taxes on real property, State and Federal aid, fees, licenses, and fines. Local sales and use taxes are sometimes imposed by counties. The Livingston County Sales Tax is proportioned among the towns in the county. The towns of Avon, Geneseo, Groveland, Livonia, and Conesus border Conesus Lake and Conesus Creek in the project area. Town Boards have the final authority to govern land use and land use planning within the limits of their respective towns. This includes adoption of a Master Plan, Zoning Districts, Rezoning and Special Improvement Districts. Further, the Town Board sets design standards for stormwater detention facilities. Town special improvement drainage districts are administered by the Town Board acting as commissioners for the Districts.

The Town Planning Boards can be delegated the authority by the Town Boards to approve subdivisions of land and site plans. Town Planning Boards act with the input from Town Boards, citizen groups, consultants, and county and regional planning departments. Funding for Planning Board activities is through Town Board appropriation. Town Planning Boards consist of a chairman and six planning board members.

Generally, a town's Department of Public Works is charged with the responsibility of maintaining the various drainage facilities dedicated to the town. Funding for public works projects is through appropriation by the Town Board.

A village is incorporated after petition of, and election by, the residents of the community. Villages are created under the Village Law, and all essentially the same Governmental structure and authority. This Law established several classes of villages, based on population, and their detailed organization and powers vary from class to class. Villages, unlike cities, remain a part of the town. Village residents vote in town elections, pay town taxes, and receive town services.

The village is governed by an elected Mayor and Board of Trustees, who appoint a number of other officers. Village Government may more easily provide municipal services such as water supply, sewage disposal, fire and police protection, street lighting, etc., than town Government.

Hamlets are unincorporated villages without any Government functions separate from the towns.

The town of Avon Conservation Advisory Board is advising the local legislative body on environmental matters.

for

The Avon Environmental Conservation Committee is responsible to environmental planning and indexing of natural resources. The committee advises local Government on the administration and protection of such resources.

Geneseo, Livonia, Conesus, and Groveland have planning boards which address environmental issues.

A joint planning board to Conesus Lake has been agreed upon by the four towns surrounding the lake, Groveland, Livonia, Conesus, and Geneseo. (Communications with Livingston County Planning Board, April 1980)

CONESUS LAKE ASSOCIATION

"One of the attractions of the residential community is that it is not a neighborhood or a community except in a limited sense. The Conesus Lake Association (incorporated in 1932) has rather effectively provided the limited social structure which most residents appear to have desired. It resembles the urban neighborhood associations which began to form a generation later in performing certain quasi-governmental functions. The Fourth of July celebration which it organizes is characteristic of other lakes, but its initiative on a number of substantial community problems is impressive. The Association can be credited as the vehicle which obtained an effective sanitary inspector before other lakes, also fire hydrants, safety regulations, and lake level control. It stood against filling of shore wetlands and for the perimeter sewer. The Association considered a control program for aquatic "weeds" in 1968, and accepted a recommendation against action." (Bloomfield: 1978)

The Conesus Lake Association, Inc., is a type A Civic-Property Owner Association under Section 201-B of the Not-for-Profit Law of New York State. Owners or residents of property around Conesus Lake can become an association member by paying $10.00 annual dues. The CLA 29 member Board of Directors

manages the corporation and the six officers carry out the Boards direction. The CLA has a system of Lake Section Representatives and 22 committees as follows:

- Executive
- Activities
- Advertising
- Auditing
- Budget
- Sunshine
- Government Affairs
- Lake of Fire
- Land Resources
- Law Enforcement
- Legislative-Governmental
- By-Laws
- Community Service Award
- Conservation
- Directory
- Disaster Service
- Water Level
- Nominating
- Numbering
- P.R./Newsletter
- Sewering
- Telephone

The 1978 Annual Financial Report showed $28,258.74 in income with ±50 percent coming from dues. Expenditures were shown at $21,044.36, with the July 4th celebration, postage and printing, and lake improvement being the three largest budget lines.

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX F
CORRESPONDENCE

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Robert F. Flacke
Commissioner

February 2, 1982

Colonel George P. Johnson
District Engineer
U. S. Corps of Engineers
Dept. of the Army
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

This will acknowledge your letter of January 15, 1982 regarding the Conesus Lake DPR and EIS advising that the cost of constructing a pedestrian bridge across the new channel will be a non-Federal cost. We have no comments on the revised items of non-Federal responsibility.

Sincerely,

James Kelley

James F. Kelley
Director
Flood Protection Bureau

RLK:pt

cc: A. Buddle

R.F.

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Robert F. Flacke
Commissioner

DIVISION OF WATER
FLOOD PROTECTION BUREAU

October 30, 1981

Colonel George P. Johnson
District Engineer
US Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

This is in regard to the proposed flood control project on Conesus Lake, Towns of Conesus, Geneseo, Groveland and Livonia, Livingston County, New York.

This Department is willing to participate in and to provide the non-Federal requirements for any project that is engineeringly and environmentally sound, and economically feasible.

Further, our Region 8 Supervisor of the Office of Natural Resources has asked that we indicate to you the support of this Department for enhanced access to the important ice-fishing resource of Conesus Lake. Your study has identified three potential access sites at the north end of the lake. Two of these sites are currently vacant and the third will require relocations because of proposed channel work. Currently, public access for ice-fishing is confined to the State Park's launch site on the east side of Conesus Lake and the Management Area at the south end. Parking in these areas is severely limited and results in many problems. Improving access at the north end of the lake and providing adequate parking would facilitate access and reduce traffic problems. We recommend that development of a public access site be made an integral part of the plan for Conesus Lake. This Department, through the Division of Fish and Wildlife, is willing to fund the required 50 percent of the cost of developing a public access site.

Sincerely,

Richard L. Tomsetta
for James F. Kelley
Director, Flood Protection Bureau

cc: A. Buddle
K. Wich
E. Holmes
RLK/ea

NEW YORK STATE PARKS & RECREATION Agency Building 1 Empire State Plaza Albany, New York 12238 Information 518 474 XXXX
Orin Lehman Commissioner

R.F.

September 25, 1981

Mr. Donald Liddell
Department of the Army
Buffalo District Corps
1776 Niagara Street
Buffalo, N.Y. 14207

Dear Mr. Liddell:

Flood Control
Conesus Lake
Livingston County

The State Historic Preservation Officer (SHPO) has reviewed the documentation you provided on this project. Based on this review, it is the SHPO's understanding that of the four areas included in the study, only area D will be subject to project impact. In addition, no sites were discovered within the impact area. Therefore, the project will not affect any cultural resources on or eligible for the National Register of Historic Places. If your plans change and you do anticipate impact on any of the discovered sites, additional investigation may be necessary.

Should you have any questions regarding this matter, please contact the project review staff at 518-474-3176.

Sincerely,

Ann Webster Smith

Ann Webster Smith
Deputy Commissioner for
Historic Preservation

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

HARRISBURG AREA OFFICE
100 Chestnut Street, Room 310
Harrisburg, Pennsylvania 17101

SEP 29 1981

Colonel George P. Johnson
District Engineer, Buffalo District
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

This constitutes our report on effects the proposed flood control project on Conesus Lake, Towns of Conesus, Geneseo, Groveland, and Livonia, Livingston County, New York, would have on fish and wildlife resources. It has been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as *amended*; 16 U.S.C. 661 *et seq.*) and is for inclusion in your Detailed Project Report and Environmental Impact Statement.

Investigations of flood problems on Conesus Lake and of alternatives to alleviate them are being conducted under the authority of Section 205 of the 1948 Flood Control Act, as amended. The project will be constructed under the same authority if approval is granted by the Chief of Engineers or the Secretary of the Army following completion of the final Detailed Project Report and Environmental Impact Statement.

Our report is based on project plans and information provided by your staff through July 31, 1981, biological studies conducted for the Corps of Engineers by Environmental Resource Associates, Inc., and field reconnaissance by U.S. Fish and Wildlife Service personnel. This report was prepared by Peter J. Petokas, Project Biologist, under the supervision of Paul P. Hamilton, Field Supervisor, U.S. Fish and Wildlife Service, Cortland, New York. Our analysis is based on a 50-year project life for the years 1981 through 2031.

This report has the concurrence of the Division of Fish and Wildlife of the New York State Department of Environmental Conservation as signified by the enclosed letter from Director Kenneth F. Wich to Field Supervisor Paul P. Hamilton dated August 19, 1981.

DESCRIPTION OF THE PROJECT

The selected plan for flood management at Conesus Lake (Fig. 1) is the 30-60 foot wide Channel Improvement and Control Structure Plan (Fig. 2) in conjunction with the Lake Level Management Plan. The plan includes the construction of a new outlet channel, channelization of the existing outlet creek below the new channel, construction of new outlet control works, and implementation of a new lake level regulation plan developed specifically for this project. The selected plan is designed to control floods generated in the Conesus Lake basin up to, and including, the 25-year flood event.

The new outlet channel would begin about 430 feet downstream of the private road bridge that crosses the existing outlet channel (Conesus Creek) and would run through an existing trailer park to the lake (Fig. 2). The new outlet channel would be about 320 feet in length, with a 25-foot bottom width and 1 on 3 side slopes. The existing channel would remain and would connect with the new channel below the trailer park. Flow from the lake would then be divided between the existing channel and the new diversion channel. The plan also includes the construction of a pedestrian bridge across the diversion channel.

The existing outlet channel would be widened to a maximum of 60 feet beginning at the downstream end of the new diversion channel to the upstream end of the new control structure. Between the control structure and the Route 20A bridge, the channel would have a 65-foot bottom width with 1 on 3 side slopes. The channel below the Route 20A bridge would have a 35-foot bottom width and 1 on 3 side slopes and would continue downstream for about one mile to just below the sewage treatment plant. Channelization below the Route 20A bridge would, for the most part, be restricted to the west bank thereby preserving most all of the trees and shrubs on the east bank. Riprap would be placed in three areas: (1) along 400 feet of the west bank of the 60-foot wide channel; (2) in the vicinity of a new outlet control structure upstream of the Route 20A bridge; and (3) at the entrance of the new diversion channel where the channel meets the lake.

A new water control structure consisting of 1,500 square feet of steel sheet-piling with eleven 6-foot by 6-foot control gates would be in the lake outlet at the location of the existing control structure upstream of the Route 20A bridge. A poured concrete sill about 6-feet wide by 2-feet thick would be located on the downstream side of the outlet works. The entire structure would be about 76 feet in total length, it would have an access walkway (gangway) on its downstream side, and would be entirely hand-operated. The structure is designed to permit the regulated discharge of water from Conesus Lake up to a maximum of 1,000 cubic feet per second (cfs). A minimum flow of 10 cfs would pass through the outlet works at all times to ensure waste assimilation in Conesus Creek downstream of the sewage treatment plant.

The Lake Level Management Plan consists of various target level ranges (Table 1) that consider requirements for flood control, recreation, fish and wildlife conservation, water supply, and downstream demand (e.g., waste assimilation capacity). The operating plan has a target lake elevation of 819 feet in the spring in order to provide northern pike spawning habitat in wetlands at the south end of the lake and tries to maintain at least 818.5 feet throughout the summer months for both recreation and fish and wildlife conservation. During winter, the water level would be lowered to 816.5 feet to provide the extra capacity needed for the storage of spring runoff. A lake level of 816.5 feet was determined to be the minimum lake level necessary to ensure adequate lake outflows for waste assimilation in the outlet creek.

DESCRIPTION OF AQUATIC AND TERRESTRIAL ECOSYSTEMS

Conesus Lake lies within the Genesee River Basin and is the westernmost of the Finger Lakes located in central and western New York. It lies about 22 miles south of the City of Rochester and is located in the Towns of Conesus, Geneseo, Groveland, and Livonia, Livingston County, New York. The lake basin drains an area of roughly 69 square miles, including the lake surface, which drains through Conesus Creek to the Genesee River. The basin is in a north-south valley that is roughly rectangular in shape and about 17 miles long and about 5 miles in average width.

The morphology of Conesus Lake is typical of the Finger Lakes, but its depth (both mean and extreme) is less than any except Honeoye and Silver lakes. At water level 818 feet, the lake has about five square miles of total surface area, a mean depth of 37.7 feet, and a maximum depth of 66 feet. The lake is 7.8 miles long, 0.83 miles in maximum width, and 0.66 miles in mean width.

The waters of Conesus Lake are high quality and are rated Class "AA", the highest water quality category in New York's classification system (State of New York, 1967). The lake is extensively and intensively utilized for water-based recreational activities, including boating, water-skiing, swimming, and year-round sportfishing. Conesus Lake has about 18 miles of shoreline, most of which is intensively developed with summer and year-round cottages and houses. Public access is restricted to the one State-owned launch site along the mid-point of the eastern shore and to the State Fish and Wildlife Management Area at the south end of the lake (Fig. 4).

The fishes of Conesus Lake and its tributaries and wetlands, and of Conesus Creek, were studied by White and Alldridge (1980). They investigated the walleye, northern pike, and centrachid fisheries in some detail. The important game fishes present in Conesus Lake include northern pike, chain pickerel, walleye, largemouth bass, and smallmouth bass. Available panfish species include the pumpkinseed, bluegill, rock bass, yellow perch, brown bullhead, and yellow bullhead. Numerous forage fishes are also present, including many cyprinid minnows and shiners. Chiotti (1979a) found that walleye was the species most preferred by anglers on Conesus Lake, followed (in decreasing order of preference) by yellow perch, largemouth bass, smallmouth bass, and northern pike.

Conesus Lake has a single outlet (Fig. 2) and several tributary streams (Fig. 1). In general, the Conesus Lake outlet creek is small (usually less than 20 feet wide) and shallow (less than two feet deep) (White and Alldridge, 1980). Water flow is sluggish to slack in most areas except in the occasional poorly defined riffle. Most riffle areas are heavily vegetated with rooted aquatics. The available substrates consist of heavily silted sands, silts, and gravels. The outlet creek is classified as Class "C" water by the State of New York (1967).

The section of Conesus Creek between the lake outlet and the sewage treatment plant (STP) (Fig. 2) was found to contain 22 fish species, with pumpkinseed, rock bass, yellow perch, banded killifish, and brook silversides predominating (White and Alldridge, 1980). White and Alldridge found few fish in the reach of Conesus Creek between the STP and the dam at West Lake Road. This was apparently due to both the impoundment of the creek and the release of STP effluent, a combination which, during low flow conditions, resulted in lowered dissolved oxygen levels in the creek and consequently in a depauperate fish and macroinvertebrate fauna (White and Alldridge, 1980). Below the dam at West Lake Road, Conesus Creek rapidly recovers, being well oxygenated and containing large populations of sunfish, suckers, darters, and cyprinid minnows and shiners. There is no apparent fish production in Conesus Creek above the West Lake Road dam and it is likely that fish populations there derive from fish migrating into the creek from Conesus Lake (White and Alldridge, 1980).

The Conesus Lake inlet area (Fig. 1) usually floods for brief periods of time during late winter and early spring, but is predominantly dry for most of the year. Because of intermittent flow, the inlet creek is classified as a Class "D" stream (State of New York, 1967). A 46-acre wetland complex adjoins the inlet creek at the south end of the lake (Fig. 4). This wetland is also usually dry and, as such, it is low quality habitat for wildlife, especially furbearers and waterfowl. Northern pike migrate to, and spawn in, the wetland during March and April, but as spring water levels recede many northern pike eggs, larvae, and fry become trapped in shallow pools that soon go dry.

In general, and as a group, amphibians and reptiles are well represented in the project area (R. Roecker, personal communication). Frogs and toads present include the spring peeper, gray tree frog, northern leopard frog, pickerel frog, wood frog, bullfrog, green frog, and American toad. Salamander species present include the slimy salamander, dusky salamander, Allegany mountain salamander, two-lined salamander, red-backed salamander, Wherle's salamander, red-spotted newt, blue-spotted salamander, Jefferson's salamander, and spotted salamander. Only two turtle species are known to occur in the lake: the midland painted turtle and the common snapping turtle. Snakes present in the area include the northern water snake, garter snake, ribbon snake, brown snake, red-bellied snake, ring-necked snake, smooth green snake, black rat snake, and milk snake.

Mammals of the watershed are represented by a diverse assemblage of species (R. Roecker, personal communication). Small mammals present include the meadow vole, white-footed mouse, meadow jumping mouse, woodland jumping mouse, masked shrew, smoky shrew, shorttail shrew, and star-nosed mole. Bats present include the little brown bat, small-footed myotis, Keen myotis, eastern pipistrel, big brown bat, red bat, and hoary bat. Squirrels present include the eastern gray squirrel, red squirrel, fox squirrel, southern flying squirrel, eastern chipmunk, and woodchuck. Mustelid mammals include the mink, short-tailed weasel, long-tailed weasel, and striped skunk. Intermediate-sized mammals include the coyote, raccoon, red fox, gray fox, opossum, and porcupine. Also present are cottontail rabbits, beaver, muskrats, and white-tailed deer.

In general, the avifaunal use of Conesus Lake and environs has never been thoroughly examined. Cursory waterfowl surveys conducted by White and Alldridge (1980) revealed summer use of the lake by mallards, wood ducks, and blue-winged teal. Fall and spring surveys revealed use of the lake by migrant black ducks, buffleheads, scaup, American wigeon, ring-necked ducks, goldeneye, Canada geese, loons, coot, and pied-billed grebes. There are also reports of canvasbacks, whistling swans, oldsquaws, ruddy ducks, common mergansers, great blue herons, and killdeer (Forest et al., 1978).

The submerged aquatic flora of Conesus Lake was studied by Forest (1977) and Forest et al. (1978). They reported the following submerged plants as occurring in the lake: Ceratophyllum demersum, Elodea canadensis, Heteranthera dubia, Myriophyllum sp., Najas flexilis, Potamogeton crispus, P. nodosus, P. pectinatus, P. perfoliatus, P. pusillus, P. zosteriformis, P. gramineus, Ranunculus sp., Vallisneria americana, and Utricularia vulgaris. Forest et al. (1978) report the following emergent and floating plants from the lake: Cephalanthus occidentalis, Decodon verticillatus, Lemna minor, L. trisulca, Nuphar variegatum, Nymphaea odorata, Peltandra virginica, Polygonum amphibium, Sagittaria latifolia, S. rigida, Scirpus acutus, S. americanus, S. atrovirens, S. validus, Sparganium eurycarpum, Typha angustifolia, T. latifolia, and Wolffia punctata. Myriophyllum, Vallisneria, and Heteranthera are abundant and sometimes locally dominant, but the greatest densities have been recorded for Ceratophyllum (Forest et al., 1978). Najas flexilis and Potomogeton spp. range from common to rare. Elodea canadensis is abundant in certain restricted areas.

PROJECT IMPACTS ON AQUATIC AND TERRESTRIAL ECOSYSTEMS

The construction of a new outlet channel and the rechannelization of the existing outlet creek, as well as the construction of a water control structure, would result in the potential for erosion of some soil into the creek and the resuspension of bottom sediments, resulting in an increased level of turbidity in the creek in the immediate vicinity of, and downstream from, project construction and maintenance activities. The increased level of turbidity could then stress the creek's fish and macro-invertebrate populations, especially fish eggs and larvae, which are particularly sensitive to changes in the concentration of suspended solids. The most detrimental effects would be expected to occur during and immediately following construction activities. They would be particularly adverse if construction were to take place during late spring and early summer when most fish breed (spawn) and when eggs, larvae, and young fish are developing.

The manipulation of water levels at Conesus Lake would have severe adverse effects on the entire lake ecosystem if the lake level management plan did not incorporate environmental considerations. However, the Corps of Engineers, in cooperation with the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service, have established lake level regulation criteria (Fig. 3) that, in conjunction with other mitigation measures (i.e., wetlands scalping and grading), would minimize potential negative impacts on the Conesus Lake fishery. The March through May lake level of 819.0 feet, selected by the Corps of Engineers as the maximum allowable spring elevation for flood protection, is expected to have a substantial impact on northern

pike reproduction by eliminating the more usual high lake levels (819.0-821.0 feet) that flood portions of the wetlands each spring to a depth suitable for northern pike spawning. Exceptionally high losses of northern pike production would be expected at any lake level below 819.0 feet. However, since no site-specific production data are available for the Conesus Lake wetlands, no quantitative estimate of losses can be readily ascertained.

The current fisheries management program at Conesus Lake (Chiotti, 1979b) currently maintains an optimal level of 3,000 northern pike adults with recruitment to the population of 400-800 three year old fish annually. If there were to be a sustained loss of annual recruitment due to lake level regulation (i.e., by holding spring lake levels below 819.0 feet), then the Conesus Lake northern pike fishery would likely be eliminated within a decade (W. J. Abraham, personal communication).

Other fishes at Conesus Lake that could be directly affected by lake level regulation include the walleye and centrarchid sunfishes and basses. The centrarchids at Conesus Lake generally nest on sand and gravel substrates at depths in the range of 3 to 18 feet (White and Alldridge, 1980). Any substantial lowering of the lake during the centrarchid spawning period (May 15-June 30) would result in the stranding and subsequent death of eggs and larvae. However, the Lake Level Management Plan (Fig. 3) calls for stable lake levels during spring and summer, with winter drawdown starting in October. Thus, lake level regulation, as currently proposed by the Corps of Engineers, should have no significant impact on centrarchid reproduction or fry survival at Conesus Lake.

Walleye production at Conesus Lake is minimal and survival of their larvae and fry is poor (White and Alldridge, 1980). Walleye prefer clean gravel substrates for spring spawning activities, but the Conesus Lake shoreline gravels are heavily silted affecting the walleye in a negative manner. Proposed spring and summer lake levels (Fig. 3) are expected to have no impact on walleye spawning or fry survival. Winter drawdown could potentially benefit the Conesus Lake walleye population by exposing silted gravels to the cleansing action of rain and waves, thereby increasing the amount of suitable spawning habitat.

The fish community of Conesus Creek could potentially be affected by the proposed clearing and widening of the creek from the vicinity of the existing trailer park to the downstream end of the sewage treatment plant (Fig. 2). However, the proposed rechannelization work is to be restricted to the creek's west bank, thereby preserving most of the natural cover along the east bank. There are only a few forage fish and some small sunfish present in the outlet creek, and it is believed that most individuals are migrants from Conesus Lake (White and Alldridge, 1980). There is no apparent fish production in the creek, and it does not appear likely that the proposed rechannelization work would have any long-term adverse effects on the creek's fish community.

The riparian woodland lining the outlet creek provides cover and sources of food for wildlife, and promotes use of the area by avian and mammalian species, as well as several species of amphibians and reptiles. Removal of shrubs and trees for channel enlargement along Conesus Creek would likely result in a decline in both the numbers of individuals and the diversity of wildlife species which presently inhabit the area. Reductions in wildlife found within the project area would have an adverse effect on the quality and quantity of this resource for local residents as a means of recreational enjoyment for purposes such as wildlife observation and nature photography.

PLAN OF DEVELOPMENT FOR AQUATIC AND TERRESTRIAL ECOSYSTEMS

In order to protect aquatic resources, a plan should be developed by the Corps of Engineers in cooperation with and approved by the New York State Department of Environmental Conservation, the U.S. Fish and Wildlife Service, the U.S. Soil Conservation Service, and the U.S. Environmental Protection Agency, to minimize the amount of project-caused erosion, siltation, and water pollution in the outlet creek during and immediately after construction.

All construction activities associated with instream or streambank areas, including the construction of a water control structure, should be restricted to a period when impacts on fish and wildlife resources would be minimal. We anticipate that the least damage to those resources would be incurred if construction were to take place during the period from July 1 to March 30.

The banks of the rechannelized outlet creek and the banks of the new outlet channel, as well as any upland areas disturbed during channel work and other construction activities, should be revegetated as soon as possible after construction to mitigate the loss of wildlife habitat. A revegetation plan should be developed for the project in cooperation with and approved by the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service. The plan should include provisions for the monitoring of growth conditions to ensure that revegetation is successful. All replanting, maintenance, and monitoring activities should be funded as project costs.

To mitigate the potentially adverse effects of lake level management on fish and wildlife and their habitats, lake levels should be held at or near the operational levels established in cooperation with and approved by the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service for the conservation and development of fish and wildlife resources (Fig. 3). These criteria should be adhered to by the Corps of Engineers as long as it exercises direct operational control of project features. Any agreements entered into for the delegation or release of operational control to another agency should include stipulations to prevent deviation from these criteria.

To compensate for the project's potentially adverse effects on northern pike reproduction in the wetlands at the south end of Conesus Lake, approximately 10 acres of State-owned wetland at the lake should be scalped, graded, and seeded to create habitat suitable for northern pike spawning and egg and fry survival. The scalping should be done in accordance with the Fish and Wildlife Management Area habitat management plan developed by the Division of Fish and Wildlife of the New York State Department of Environmental Conservation in cooperation with the U.S. Army Corps of Engineers and the U.S. Fish and Wildlife Service (Fig. 4). Excess spoil from the scalping process should be deposited and shaped to form a berm on the upland side of scalped areas to prevent northern pike spawning in areas where eggs and fry could potentially be stranded. All stripped areas should be seeded using rye grass, reed canary grass, or other suitable cover plants prescribed by the New York State Department of Environmental Conservation. Since the proposed scalping is a measure needed to mitigate potential project-caused impacts on the northern pike fishery, the estimated $64,000 needed to scalp, grade, and seed 10 acres of wetland should be funded as a project cost. There are no anticipated land acquisition costs, nor any operation and maintenance costs over the life of the project.

The Division of Fish and Wildlife of the New York State Department of Environmental Conservation has proposed that access for ice fishermen be provided at the north end of Conesus Lake where currently there is no public access. Fisherman utilizing this area in winter cause problems with property owners by parking illegally. We estimate that the access facilities would be fully utilized at year one of the project and continue at that level throughout the 50-year project life. Three alternative ice fisherman parking areas have been proposed by the New York State Department of Environmental Conservation (Fig. 5), two of which (A and C) would require a pedestrian access route and a footbridge over Conesus Creek. Area B is the site preferred by the New York State Department of Environmental Conservation. Estimated costs for land acquisition, construction (grading, laying of a gravel bed, path and bridge construction, etc.), and operation and maintenance are presented in Table 2. Such an enhancement feature would have to be cost-shared in accordance with provisions of U.S. Public Law 89-72 (Federal Water Project Recreation Act). With development of an adequate access facility, we estimate that an average annual 4,050 new angler-days for warmwater fish would occur over the project life. This level of use derives from the following expected trends.

Years	Angler-days[1/]
Initial	4,050
50th	4,050

1/ Each angler-day is valued at $3 developed in accordance with the Water Resources Council's unit day value approximation of willingness to pay (Procedures for Evaluation of NED Benefits and Costs in Water Resources Planning - Level C)

RECOMMENDATIONS

We recommend that:

1. Prior to project construction, a plan be developed by the Corps of Engineers in cooperation with and approved by the New York State Department of Environmental Conservation, the U.S. Fish and Wildlife Service, the U.S. Soil Conservation Service, and the U.S. Environmental Protection Agency, to minimize the amount of project-caused erosion, siltation, and water pollution in the outlet creek during and immediately after construction.

2. To minimize adverse impacts on fish and wildlife resources, all construction activities associated with instream or streambank areas, including the construction of a water control structure, be restricted to the period from July 1 to March 30.

3. To mitigate project-caused losses of wildlife habitat, the banks of the rechannelized outlet creek and the banks of the new outlet channel, as well as any upland areas disturbed during channel work and other construction activities, be revegetated as soon as possible after project construction. We further recommend that (a) prior to project construction, a revegetation plan be developed for the project in cooperation with and approved by the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service, (b) the plan include provisions for the monitoring of growth conditions to ensure that revegetation is successful and the replacement of dead or dying plant species, and (c) all replanting, maintenance, and monitoring activities be funded as project costs.

4. To mitigate the potentially adverse effects of lake level management on fish and wildlife and their habitats, lake levels be held at or near the operational levels established in cooperation with and approved by the New York State Department of Environmental Conservation and the U.S. Fish and Wildlife Service for the conservation and development of fish and wildlife resources, and that these criteria be adhered to by the Corps of Engineers as long as it exercises direct operational control of project features, and that any agreements entered into for the delegation or release of operational control to another agency include stipulations to prevent deviation from these criteria.

5. To compensate for project-caused losses of northern pike spawning habitat and productivity at Conesus Lake, approximately 10 acres of State-owned wetland at the lake be scalped and graded to provide the quantity and quality of spawning habitat needed to offset those

losses. We further recommend that (a) all scalping and grading be done in accordance with the Fish and Wildlife Management Area habitat management plan (Fig. 4), (b) excess spoil from the scalping process be deposited and shaped to form a berm on the upland side of the scalped areas, (c) all stripped areas be seeded using rye grass, reed canary grass, or other suitable cover plants prescribed by the New York State Department of Environmental Conservation, and (d) the estimated $64,000 needed to provide the above habitat management features be funded as a project cost.

6. To enhance public use of fish and wildlife resources, public access for ice fishing be provided at the north end of Conesus Lake where there are currently no public access sites. We further recommend that (a) one of the three alternative sites proposed by the Division of Fish and Wildlife of the New York State Department of Environmental Conservation (Fig. 5) be ultimately chosen as the selected site, (b) the New York State Department of Environmental Conservation's preferred site (Area B) be given first priority for consideration as the selected site; and (c) that all costs for land acquisition and construction for this recreation feature be cost-shared by the Federal Government and the State of New York in accordance with provisions of U.S. Public Law 89-72 (Federal Water Project Recreation Act).

Please continue to coordinate this project with us as it develops, and advise us of any changes or additions to the project so that consideration may be given to revise or supplement this report.

Sincerely,

Norman R. Chupp

Norman R. Chupp
Area Manager

Enclosures

REFERENCES

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State of New York. 1967. Official compilation of codes, rules and regulations of the State of New York. Title 6. New York State Department of State, Albany.

Roecker, R. Personal Communication. Department of Biological Sciences, State University of New York, College of Arts and Sciences at Geneseo.

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Copies sent to:

Mr. Kenneth F. Wich, Director
New York State Department of Environmental Conservation
Division of Fish and Wildlife
50 Wolf Road
Albany, New York 12233

Mr. Edward D. Holmes, Regional Supervisor
New York State Department of Environmental Conservation
Division of Fish and Wildlife
6274 East Avon-Lima Road
Avon, New York 14414

Regional Administrator
U. S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278

Table 1. -- Desired lake levels for Conesus Lake, Livingston County, New York.

Purpose	Range[1,2] Upper	Range[1,2] Lower	Period	Remarks
Flood Control	819.5	N/A	At all times	Level where minor flood damage begins
Recreation	819	818	Apr. 15-Oct. 15	Optimal levels for general recreational use
Fish & Wildlife	819.5	819	Mar. 1-Jun. 15	Optimal levels for northern pike spawning
Municipal Water Supply	N/A	815	At all times	Water intakes kept at sufficient depth
Lake Outflows	-	816.5	At all times	Inadequate outflow below this level
Winter storage	-	816.5	Nov. - Jan.	Level necessary to provide storage capacity for flood control

[1]Elevations in feet above mean sea level.

[2]Indicated lake levels are from Corps of Engineers Stage III Detailed Project Report and Environmental Impact Statement, Conesus Lake, New York.

Table 2.--Estimated costs for the acquisition, construction, operation, and maintenance of (a) mitigation measures needed to compensate for predicted with-the-project fish spawning habitat and production losses, and (b) enhancement features for improved ice fisherman access at Conesus Lake, Livingston County, New York.

Proposed Action[1]	Number of Acres	Cost per Acre	Acquisition[2] Costs	Construction[2] Costs	Annual Operation and[2] Maintenance Costs
Mitigation Measure					
--Wetlands Scalping	10.0	None[3]	None[3]	$64,000[4]	None
-- Berm Construction	3.1	None[3]	None[3]	None[5]	None
Enhancement Feature					
--Ice Fisherman Access[6]					
--Alternative A	1.5	$ 7,500	$11,250	$15,000	$500
--Alternative B	1.0	$26,500	$26,500	$10,000	$500
--Alternative C	1.5	$10,500	$15,750	$12,500	$500

[1]Mitigation measures are to be funded at project cost, whereas enhancement features are to be cost-shared (excluding operation and maintenance costs) in accordance with provisions of U.S. Public Law 89-72 (Federal Water Project Recreation Act).

[2]Costs estimated by the U.S. Army Corps of Engineers, the New York State Department of Environmental Conservation, and the U.S. Fish and Wildlife Service based on 1981 dollars.

[3]Involves land already in State ownership.

[4]Includes costs for two seedings of scalped and graded areas at $5,000 per seeding.

[5]There are no costs associated with berm construction, since the berms will be developed during the wetlands scalping process by depositing and shaping available spoil.

[6]Alternatives A and C each include 0.5 acre of land and $7,500 in construction costs for a pedestrian access route to the lakeshore.

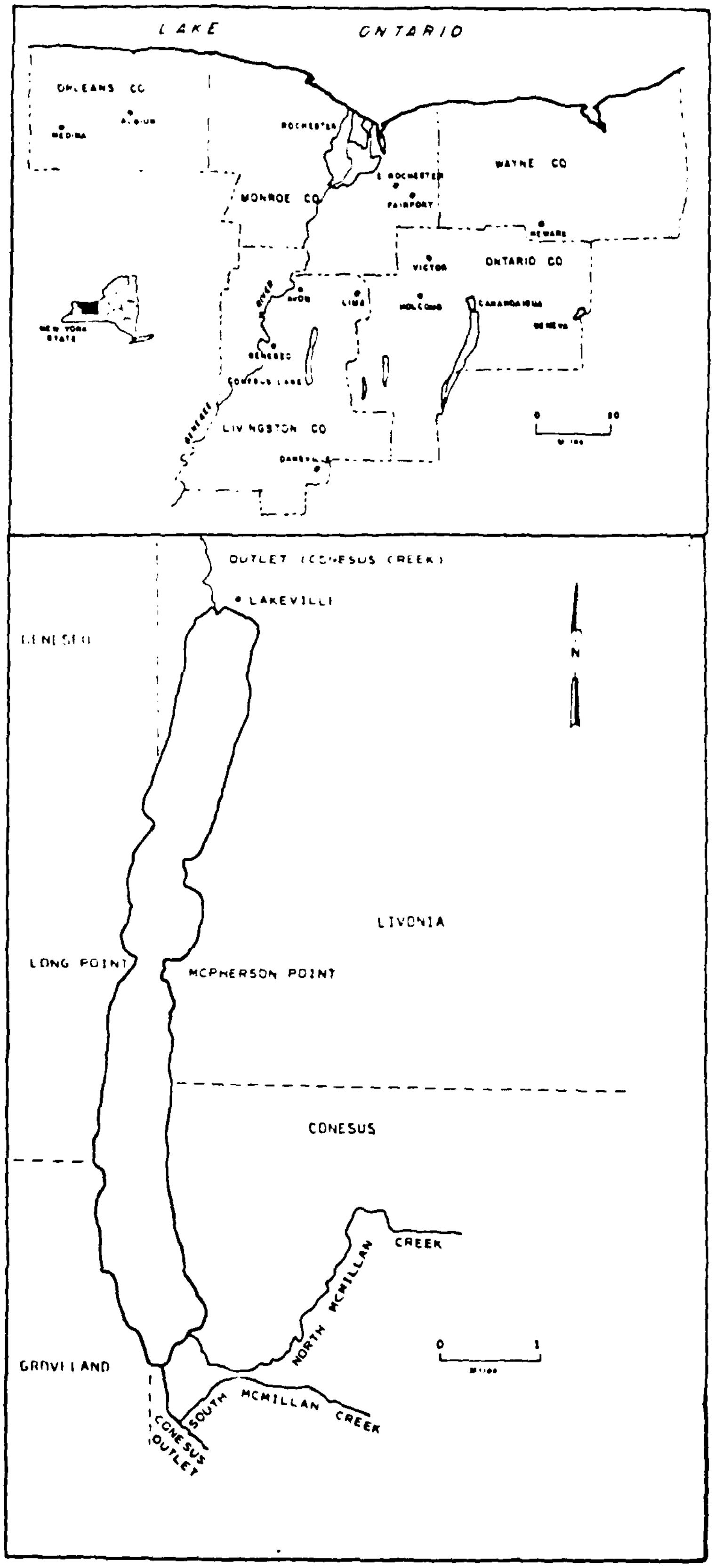


Figure 1.--Location of Conesus Lake in western New York.

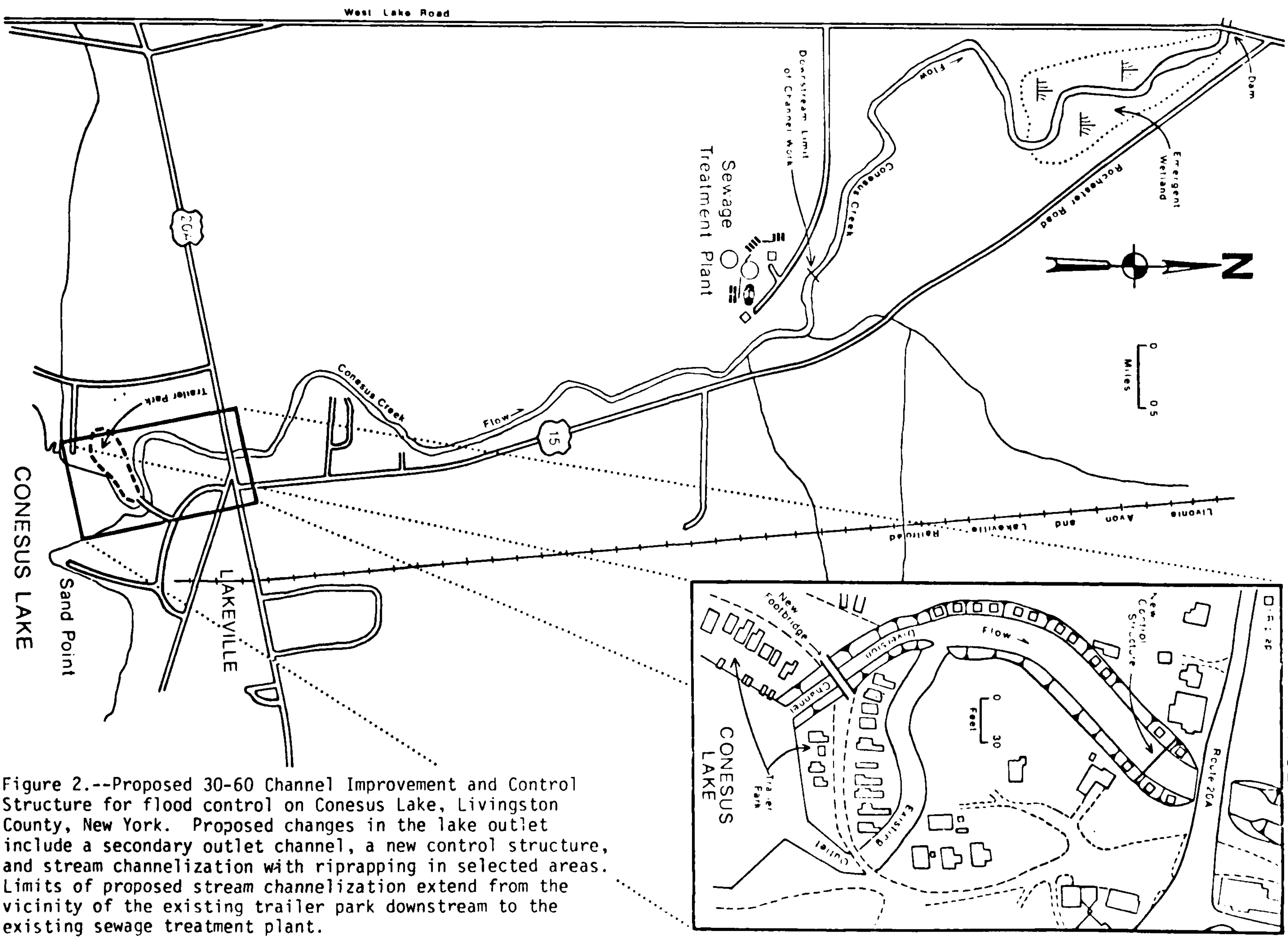


Figure 2.--Proposed 30-60 Channel Improvement and Control Structure for flood control on Conesus Lake, Livingston County, New York. Proposed changes in the lake outlet include a secondary outlet channel, a new control structure, and stream channelization with riprapping in selected areas. Limits of proposed stream channelization extend from the vicinity of the existing trailer park downstream to the existing sewage treatment plant.

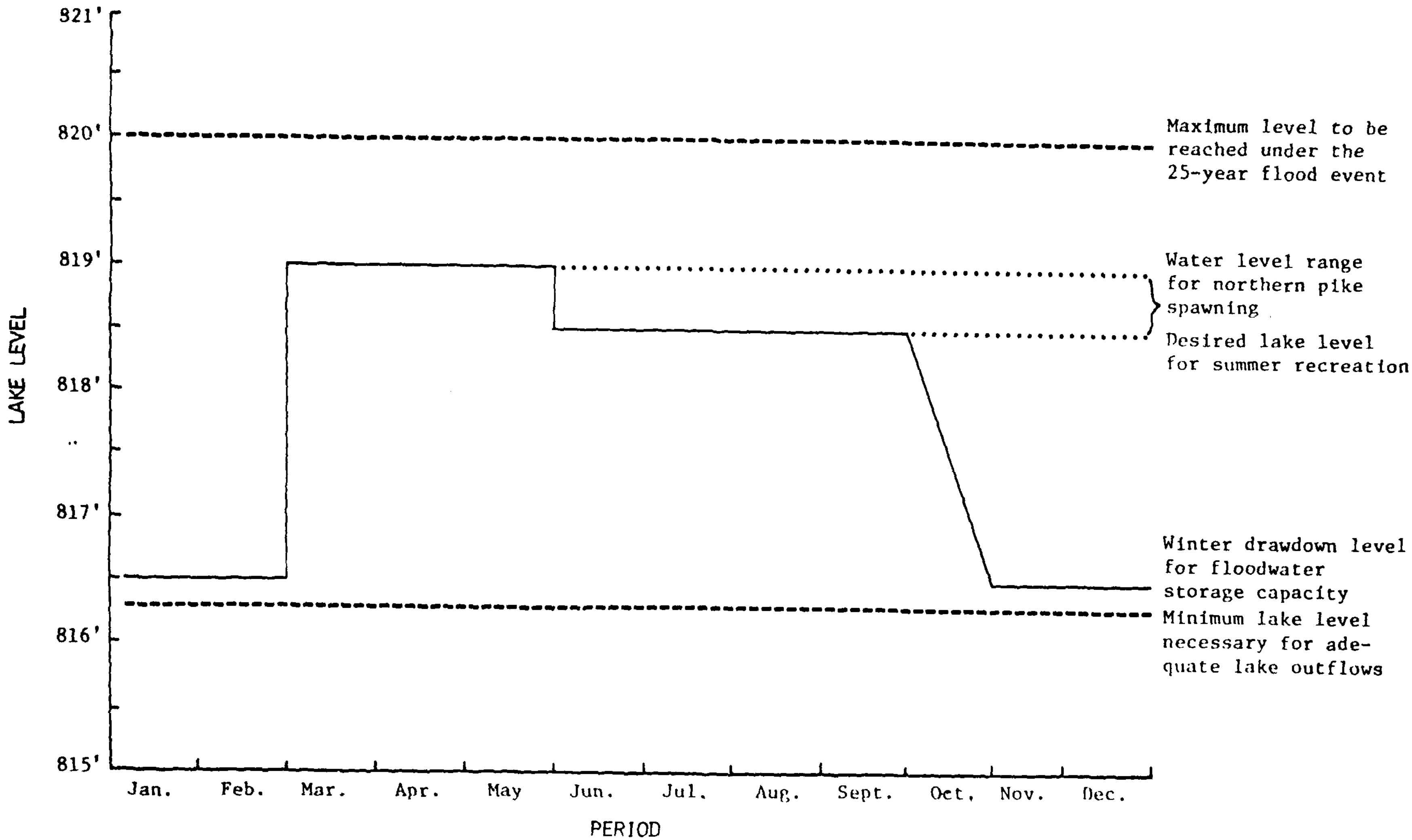


Figure 3.--Proposed target levels (solid line) for flood control, fish and wildlife conservation, and recreation on Conesus Lake, Livingston County, New York. Indicated lake levels are from the Corps of Engineers Stage III Detailed Project Report and Environmental Impact Statement, Conesus Lake, New York.

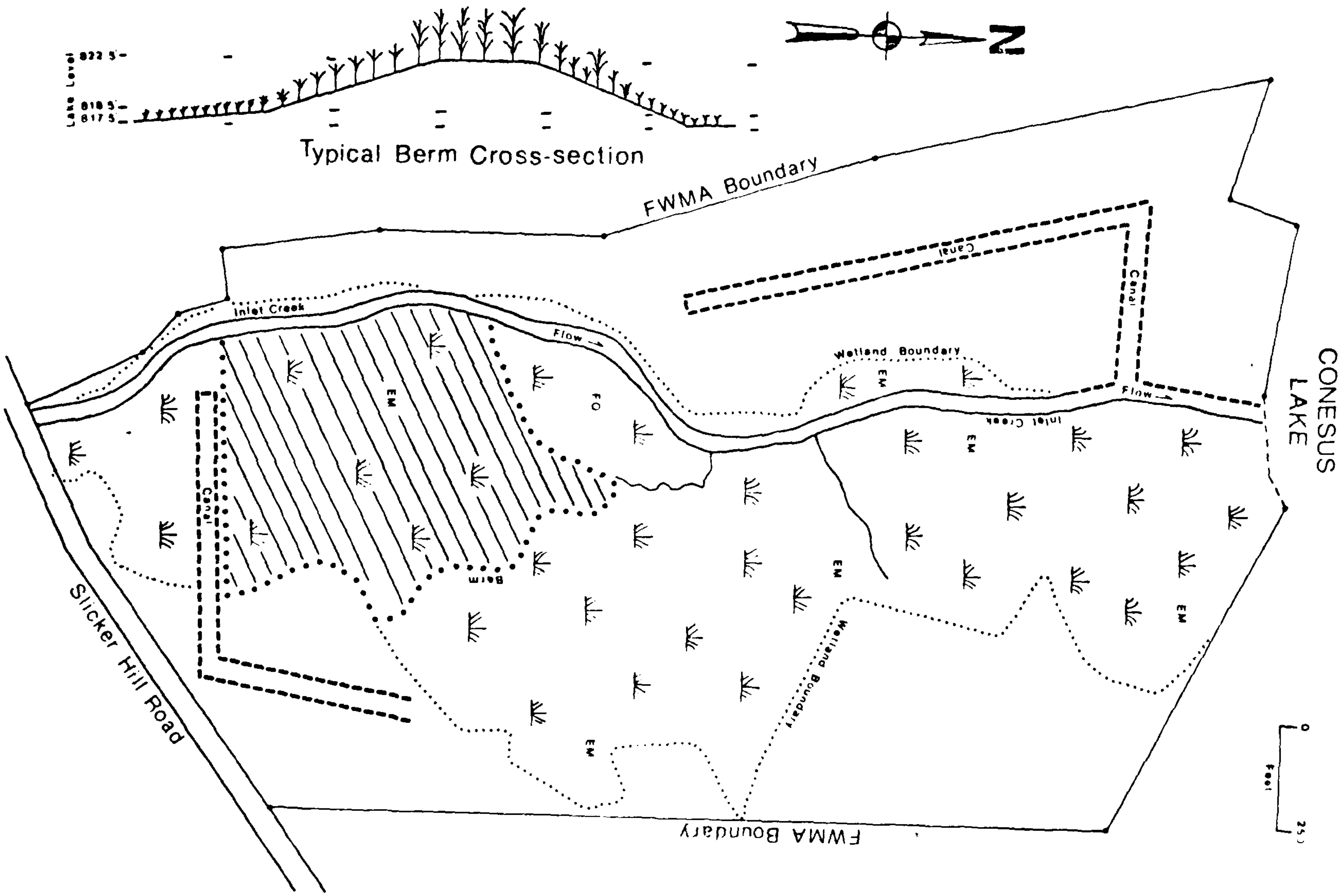


Figure 4.--Proposed habitat management features for the New York State Department of Environmental Conservation Fish and Wildlife Management Area (FMWA) at Conesus Lake, Livingston County, New York. Hatching indicates area where 10 acres of wetland will be scalped and graded; heavy dotted lines indicate areas where spoil from the scalping process will be deposited and shaped to form soil berms. EM=emergent wetland; FO=forested wetland.

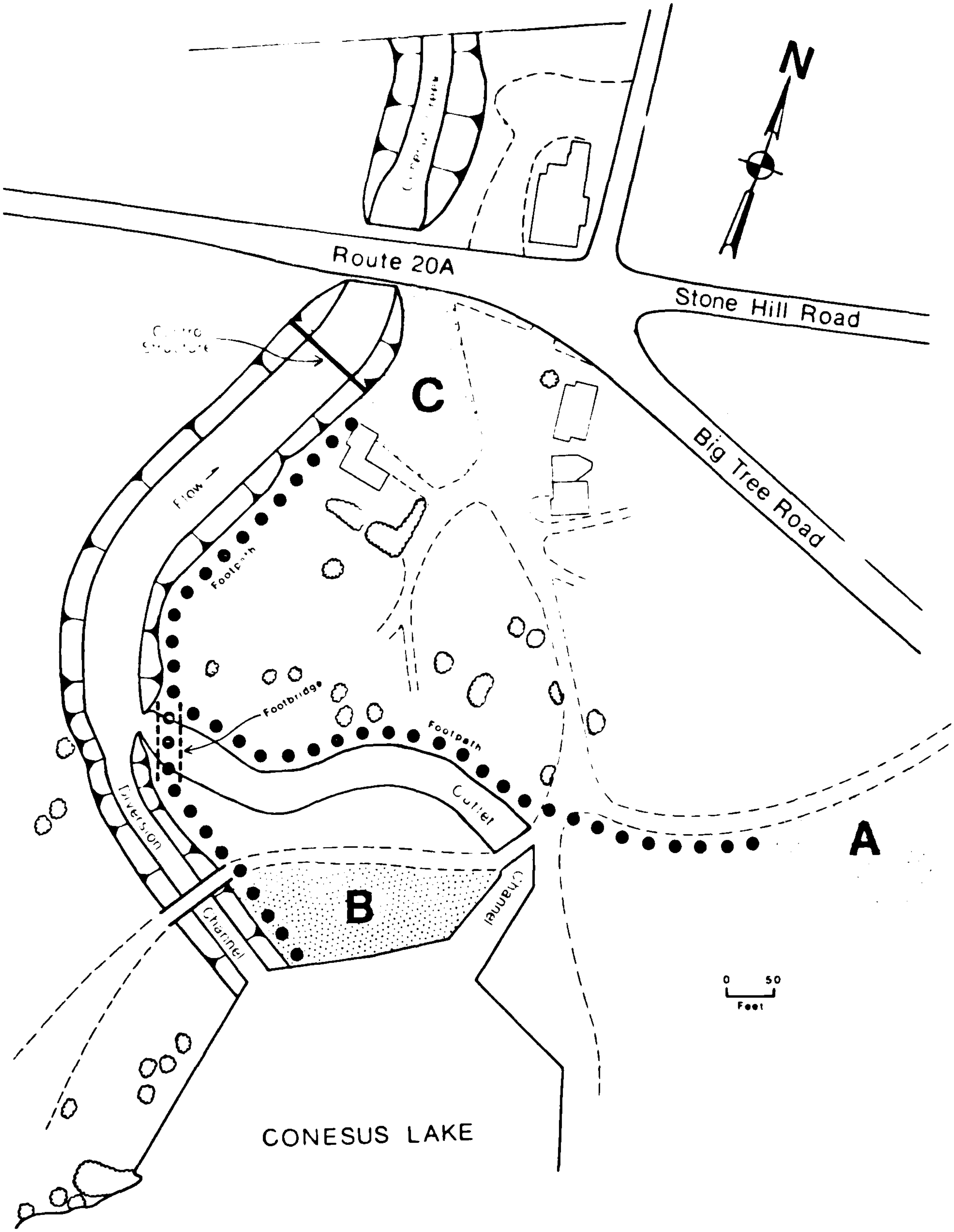


Figure 5.--Proposed alternative ice fisherman parking areas and pedestrian access routes at Conesus Lake outlet, Livingston County, New York. Parking area A is an existing gravel parking lot; area B is part of an existing trailer park that would be severed by the proposed outlet diversion channel; and area C is an existing vacant lot. A pedestrian corridor (dotted line) and a footbridge would be necessary should either area A or C be selected for ice fisherman parking.

New York State Department of Environmental Conservation
6274 E. Avon-Lima Rd., Avon, NY 14414
716-226-2466

Robert F. Flacke
Commissioner
Eric A. Seiffer
Regional Director

August 19, 1981

Mr. Paul P. Hamilton
Field Supervisor
U.S. Dept. of the Interior
Fish and Wildlife Service
100 Grange Place, Room 202
Cortland, NY 13045

Dear Mr. Hamilton:

The Division of Fish and Wildlife concurs with the findings and recommendations of the report on the Conesus Lake Flood Control Project, Livingston County, New York prepared under the authority of the Fish and Wildlife Coordination Act (16 USC 661).

We would like to clarify one point made on page 15, second paragraph. The Department of Environmental Conservation does not currently own lake frontage at Alternate Site B for ice-fishermen access. The New York State Office of General Services claims ownership of land known as Sand Point which is located south of Alternate Site C. Currently, the land is occupied by several cottages with questionable title. Alternate Sites A, B and C are currently vacant land.

Sincerely,

Edward D. Holmes

Edward D. Holmes
Regional Supervisor of Natural Resources

Kenneth Wich

Kenneth Wich
Director Division of Fish and Wildlife

EDH:mm

THE SENATE
STATE OF NEW YORK

L. PAUL KEHOE
52ND DISTRICT
ROOM 515, LOB
ALBANY NY 12247
(518) 455-2031

COMMITTEES
AGRICULTURE
BANKS
COMMERCE & ECONOMIC DEVELOPMENT
ENERGY
GOVERNMENT OPERATIONS
HEALTH

August 12, 1981

George P. Johnson
Colonel, Corps of Engineers
Commander and District Engineer
Dept. of Army
1776 Niagara Street
Buffalo, N.Y. 14207

Dear Colonel Johnson:

I have received the copy of the Draft Detailed Project Report and Draft Environmental Impact Statement and associated Appendices, entitled "Conesus Lake, New York."

Although I have not had the opportunity to read the report as yet, I would like to thank you for supplying me with this copy which I intend to peruse in the very near future.

Very truly yours,

L. PAUL KEHOE
Member of Senate

Conesus Lake Association Inc.
P.O. BOX 79, LIVONIA, N.Y. 14487

July 28, 1981

Colonel George Johnson
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

We of the Conesus Lake Association certainly want to go on record with our commendation of you and your staff on the conduct of the hearing in Livonia on Wednesday, July 22nd.

Frequently a scarcity of questions and arguments indicates a lack of interest. In this case, it was readily apparent that the Corps had performed their "homework" well and the project understood by residents.

I have written to Mr. Conable informing him in a brief form of the success of the hearing and your excellent presentation.

Again, our Association offers its assistance to the Corps at any time during the progress of the project. We appreciate the opportunity to help.

Sincerely,

James M. Culliton

JMC:jfm

James M. Culliton, President
Conesus Lake Association

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PN

21 Jul 81

Mail Label

I am pleased to furnish copies of the Buffalo District's Draft of the Conesus Lake Detailed Project Report, dated July 1981. The report details recommended flood damage reduction measures for the Conesus Lake vicinity, Livingston Co., NY.

I am requesting that your office make the enclosed reports available for public review during the next several months.

A combined Stage 3 public meeting and Section 404 public hearing was held on 22 July 1981. The public comments will be addressed before submittal of the finalized report.

Sincerely,

GEORGE P. JOHNSON
Colonel, Corps of Engineers
Commander and District Engineer

Incl
as stated

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

17 July 1981

Mr. William Hedeman Jr.
Director of Office of Federal Activities
US Environmental Protection Agency (A-104)
Washington, DC 20460

Dear Mr. Hedeman:

Enclosed are five copies of the Draft Detailed Project Report (DDPR), the Draft Environmental Impact Statement (DEIS) and associated Appendices entitled "Conesus Lake, New York." A Final Detailed Project Report (FDPR) and Final Environmental Impact Statement (FEIS) will be furnished upon completion of coordination with concerned Federal and State agencies and consideration of public views.

The DEIS has been prepared in accordance with the Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act" 40 CFR 1500-1508, as promulgated in Corps of Engineers Regulation ER 200-2-2 "Environmental Quality: Policies and Procedures for Implementing NEPA." In addition, the DDPR and DEIS have been combined into a single document in accordance with Corps of Engineers Regulation ER 1105-2-920 "Feasibility Reports: Organization and Content."

The release of these documents to the general public can be made with proper notation that they are draft reports issued for the purpose of obtaining the views of governmental and private interests concerned with the proposed project and the impacts of project development on the environment.

To date, no organized opposition to the preferred plan identified in these documents, has been expressed by any agencies or groups.

Sincerely,

1 Incl (quint)
as stated

GEORGE P. JOHNSON
Colonel, Corps of Engineers
Commander and District Engineer

New York State Department of Environmental Conservation
6274 E. Avon-Lima Rd., Avon, New York 14414
Telephone: 716-226-2466 or 624-3350

Robert F. Flacke
Commissioner

Eric A. Seiffer
Regional Director

June 30, 1981

Mr. Paul Hamilton
Field Supervisor
U.S. Department of Interior
Fish and Wildlife Service
100 Grange Place
Room 202
Cortland, NY 13045

Dear Paul:

We received your letter of June 17, 1981 concerning the Fish and Wildlife Coordination Act Report on the Conesus Lake Project. As stated in your letter, agreements were reached on many of the problems expressed in our letter of non-concurrence of December 22, 1980. Our continued coordination should help solve the remaining problems shortly.

Very truly yours,

Edward D. Holmes

Edward D. Holmes
Regional Supervisor
Office of Natural Resources
Region #8

JCC:er
cc: Corp of Engineers

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
100 Grange Place
Room 202
Cortland, New York 13045

June 17, 1981

Colonel George P. Johnson
District Engineer, Buffalo District
U.S. Army Corp of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

This refers to our November 1980 draft Fish and Wildlife Coordination Act Report on the Conesus Lake Project, and subsequent comments by the New York State Department of Environmental Conservation (NYSDEC). With regard to the disagreements expressed in that letter, we met with NYSDEC personnel at Avon on June 10, 1981. We reached agreements on most points and will continue coordination to solve any remaining problems. We hope to have everything worked out and our revised report in final form submitted to you in time to meet your milestone for completion of the final report.

Sincerely yours,

Paul P. Hamilton

Paul P. Hamilton
Field Supervisor

cc: NYSDEC, Avon, NY Attn: Ned Holmes

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE 6 July 1981

Addendum
to
Preliminary Section 404 Evaluation
Flood Protection
Conesus Lake, Livingston, County, NY

The following are recent updated revisions to the Preliminary Section 404 Evaluation for Conesus Lake:

1. Discard the old map and insert the new map of Selected Plan of Improvement which identifies the new control structure;

2. Page E-1, para 1.2 - change the word "apron" to "sill." All subsequent references to "apron" in the 404 Evaluation shall mean "sill;"

3. Page E-2, delete para. 1.7 and insert the following new paragraph 1.7:

1.7 A new control structure, constructed from steel sheet piling, a concrete sill, and sluice gates, will be installed across the creek about 100 feet upstream of the Route 20A Bridge. Both banks and channel bottom between the 20A Bridge and the new control structure, and left bank from a distance of about 250 feet upstream from the Route 20A Bridge to a point about 650 feet upstream of the Route 20A Bridge (400 feet), would also be lined with 6 inches of bedding stone and topped with 12 inches of stone riprap. In addition, the first 50 feet from the lake - both left and right banks - of the new diversion channel will be lined with riprap.

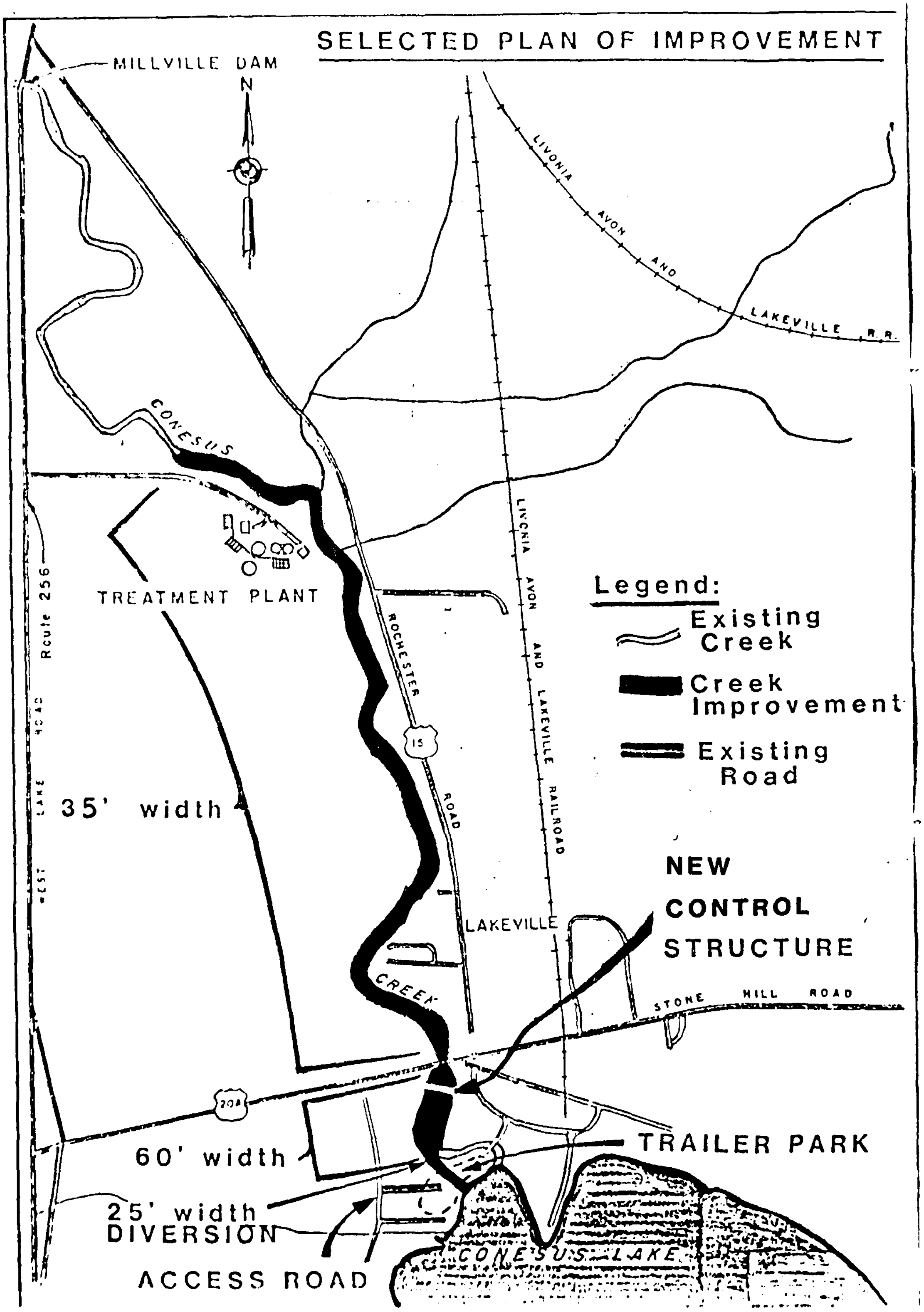
4. Page E-3, para. 2.2.2, change the last sentence to read, "The steel sheet pile structure across Conesus Creek may create a riffle zone and most of the piling and concrete would be visible;

5. Page E-4, para 3.2, change floodproofing to "flood control."

6. Page E-6, para 6.7.3 b., delete "100 feet below."

These revisions should be inserted into the preliminary Section 404. If you require further information, please contact Mr. Charles Zernentsch, Study Manager at 716/876-5454, extension 2244.

GEORGE F. JOHNSON
Colonel, Corps of Engineers
Commanding


SELECTED PLAN OF IMPROVEMENT
MILLVILLE DAM
N
LIVONIA AVON AND LAKEVILLE R.R.
CONESUS
TREATMENT PLANT
Route 256
WEST LAKE ROAD
ROCHESTER ROAD
15
LIVONIA AVON AND LAKEVILLE RAILROAD
Legend:
Existing Creek
Creek Improvement
Existing Road
35' width
NEW CONTROL STRUCTURE
LAKEVILLE
CREEK
STONE HILL ROAD
20A
60' width
TRAILER PARK
25' width
DIVERSION
ACCESS ROAD
CONESUS LAKE

New York State Department of Environmental Conservation
6274 E. Avon-Lima Rd., Avon, New York 14414
Telephone: 716-226-2466 or 624-3350

Robert F. Flacke
Commissioner

Eric A. Seiffer
Regional Director

June 30, 1981

Mr. Paul Hamilton
Field Supervisor
U.S. Department of Interior
Fish and Wildlife Service
100 Grange Place
Room 202
Cortland, NY 13045

Dear Paul:

We received your letter of June 17, 1981 concerning the Fish and Wildlife Coordination Act Report on the Conesus Lake Project. As stated in your letter, agreements were reached on many of the problems expressed in our letter of non-concurrence of December 22, 1980. Our continued coordination should help solve the remaining problems shortly.

Very truly yours,

Edward D. Holmes

Edward D. Holmes
Regional Supervisor
Office of Natural Resources
Region #8

JCC:er
cc: Corp of Engineers

January 12, 1981
1428 West Lake Rd.
Conesus, New York 14435

Mr. Robert Ridley
Acting President
Conesus Lake Association
2929 East Lake Rd.
Livonia, New York 14487

Dear Mr. Ridley:

In regard to your letter on what effect the Genesee Expressway will have on development in the flood plain and surrounding areas; at the present time we have no idea as to what effect this will cause. Any future development would depend on costs of transportation, taxes, etc.. At the present time we would not expect to see any great rush of people or businesses to our area.

Any requests for development in this area would be carefully evaluated by our planning board and the effect on the area would be our first consideration in allowing any development that would be detrimental to our area.

cc: Hon. Barber Conable
C. Zernentsch, U.S. Army Corps. Engineers
P. DiMartini
K. Conlon
D. Mulvaney
A. Macauley
M. Linsner

Yours truly,

Herbert W. Page

Herbert W. Page
Chairman,
Groveland Planning Board

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
100 Grange Place
Room 202
Cortland, New York 13045

January 28, 1981

Colonel George P. Johnson
District Engineer, Buffalo District
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

This letter addresses our efforts toward the completion of a final Fish and Wildlife Coordination Act report for the Conesus Lake Flood Control Project, Livingston County, New York. It does not constitute the report of the Service and the Department of the Interior on the proposed project within the meaning of Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.).

Since the mailing of our draft Fish and Wildlife Coordination Act Report on November 5, 1980, we have re-evaluated fish and wildlife resource information and mitigation plans, the New York State Department of Environmental Conservation's fish and wildlife management plans, and project design and timing. We now realize that the Conesus Lake Flood Control Project has advanced far too rapidly to permit an in-depth and concise analysis of project-related impacts on fish and wildlife resources. The following paragraphs address our concerns regarding details of project design and project timing and our needs for the completion of a final FWCA report.

Our draft Fish and Wildlife Coordination Act report was prepared using design information contained in the DPR prepared for the Conesus Lake project. While the DPR lacked sufficient information regarding project design, we had anticipated that additional design details would become available for use in preparing the final FWCA report; however, no new information has, as yet, been presented to us. An in-depth and concise analysis of project-related impacts on fish and wildlife resources will require additional detailed descriptions, figures, and maps for control structures and channel relocations and modifications for each of the project alternatives. Likewise, the New York State Department of Environmental Conservation believes that it would be premature to prepare an FWCA report using design information presented in the DPR (letter enclosed).

The New York State Department of Environmental Conservation has reviewed our draft Fish and Wildlife Coordination Act report and has sent us a letter of non-concurrence (copy enclosed). Their stated concerns reflect (a) the paucity of interagency communication on all aspects of this project, (b) our misunderstanding of the NYSDEC's fish and wildlife management goals at Conesus Lake, (c) the lack of detailed plans for fish and wildlife resource development at the lake, and (d) the expedience with which this project has been pushed forward. We have since initiated greater coordination with the NYSDEC concerning the proposed project and have requested and received copies of their fisheries and wildlife management plans for the lake. Much additional information and coordination is needed, however, to assure that the NYSDEC's concerns and needs for fish and wildlife management at Conesus Lake are incorporated into the final FWCA report.

In order to facilitate the preparation of a final Fish and Wildlife Coordination Act report for the Conesus Lake Flood Control Project, we herein request that:

1. The Corps of Engineers provide additional detailed information regarding all aspects of project design to the Cortland Field Office staff and to the Regional Office of the New York State Department of Environmental Conservation at Avon, New York.

2. The Corps of Engineers grant additional time to facilitate (a) coordination between the Service and the NYSDEC, (b) the preparation and interagency review of a second <u>draft</u> FWCA report, and (c) the preparation of a <u>final</u> FWCA report. In order to complete all of the above in a timely manner, we request a delay until May 20, 1981, for the formal presentation of our final FWCA report.

3. The Corps of Engineers provide additional transfer funds in the following amounts:

We strongly urge you to provide the detailed project information and additional time and transfer funds necessary for the continuation and completion of interagency fish and wildlife resources coordination and for the completion of a final Fish and Wildlife Coordination Act report.

Please contact me if you have any questions (FTS 882-4246/7).

Sincerely yours,

Paul P. Hamilton

Paul P. Hamilton
Field Supervisor

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
100 Grange Place
Room 202
Cortland, New York 13045

June 17, 1981

Colonel George P. Johnson
District Engineer, Buffalo District
U.S. Army Corp of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

This refers to our November 1980 draft Fish and Wildlife Coordination Act Report on the Conesus Lake Project, and subsequent comments by the New York State Department of Environmental Conservation (NYSDEC). With regard to the disagreements expressed in that letter, we met with NYSDEC personnel at Avon on June 10, 1981. We reached agreements on most points and will continue coordination to solve any remaining problems. We hope to have everything worked out and our revised report in final form submitted to you in time to meet your milestone for completion of the final report.

Sincerely yours,

Paul P. Hamilton

Paul P. Hamilton
Field Supervisor

cc: NYSDEC, Avon, NY Attn: Ned Holmes

CONESUS LAKE

30 December 1980

During the past 5 months we have continued to work toward completing the detailed report on Conesus Lake Flood Control. Several questions have been recurring and we would like to take a moment to address some of them.

What is the current schedule?

The draft report is due to be completed in April 1981. It then goes through one month of intensive review by our Division Office which is our regional headquarters. After their comments are incorporated, the report will be distributed for public comment. Any additional comments will be included before the report is considered final. By this time it will be September 1981.

What remains to be done before the draft report is completed?

Project design and the Environmental Impact Statement (EIS) are scheduled to be completed by March 1981. The EIS and the lake level regulation plan are the two most significant aspects of the study.

How much will the locals have to contribute to the project?

The local cooperator is responsible for providing all lands, easments, rights-of-way, along with the cost of relocating utilities. In this State, the New York State Department of Environmental Conservation (NYSDEC) is the local cooperator on all projects and in turn provides all lands, easement, rights-of-way, and in some cases utility relocation costs. Although NYSDEC would not provide the sewer relocation cost associated with this project, it appears that the costs to relocate the sewer will be much less than originally anticipated. While we would like to be able to give you an actual dollar figure, we are unable to at this time. All we can say is that the $100,000 plus figure which has been mentioned appears much higher than what we would expect.

U.S. ARMY ENGINEER DISTRICT, BUFFALO
1776 NIAGARA STREET
BUFFALO, N.Y., 14207

COUNTY SEWER DISTRICT
Box 396
Lakeville, N.Y. 14480

PLEASE NOTE:

As you will notice, the Engineer does not mention what the installation of lift stations in Lakeville will mean in costs due to maintenance and power. At the present time we have 26 lift stations for the Lake alone. The six stations required at Lakeville would also have to take care of the Village of Livonia, which is now gravity flow to the Plant. At the present time our Electric costs for the present lift stations is an average of $1500.00 per month.

Also, to borrow $900,000.00 today would mean a substantial increase in Sewer costs both on the lake and in the Village of Livonia.

State and Federal Aid is slow in coming, if you can get any, and the money would have to be borrowed to start Engineering and Construction. This could mean substantially raising sewer rents. The cost at this time to the District could be in excess of $100,000.00 a year to be borne by the users.

At the present time with the present lift stations, we get waste material that is difficult to treat due to being broken up and in suspension that is difficult to settle out. Six more pump stations would increase this problem. This means more chemicals to do the job. Chemical costs now run $1500 to $2000 a month.

There are many things to consider in changing the present sewer. Perhaps, the widening and maintaining of the stream bed would be the most economical direction to go. Certainly the people, with the way our economic situation is today.

Herbert W. Page
Herbert W. Page
Administrator

New York State Department of Environmental Conservation
6274 E. Avon-Lima Rd., Avon, New York 14414
Telephone 716-226-2644

Robert F. Flacke
Commissioner
Eric A. Seiffer
Regional Director

December 22, 1980

Mr. Paul P. Hamilton
Field Supervisor
U.S. Dept. of Interior
Fish & Wildlife Service
100 Grange Place - Room 202
Cortland, New York 13045

Dear Mr. Hamilton:

The Division of Fish and Wildlife does not concur with the findings and recommendations of the report on the Conesus Lake Flood Control Project, Livingston County, New York, prepared under the authority of the Fish and Wildlife Coordination Act (16 UFC 661).

The following comments were generated by a review of the report by Region 8 staff:

1. The Conesus Inlet Creek has important fishery value. Northern Pike travel this stream to and from the spawning area at the south end of Conesus Lake. Walleye and White Sucker also use Conesus Inlet during spawning.

2. Present fishery management of Conesus Lake is not geared solely to the northern pike fishery. Current efforts include the restoration of the walleye fishery through regulations, fry stocking and shoreline protection.

3. Major spawning of northern pike, walleye and white suckers occur at the south end of Conesus Lake in the Inlet stream. No significant spawning occurs in the outlet streams at the north end of Conesus Lake.

4. Cottage and shoreline development have not reduced the significance of lake level management. Current management involves shoreline and littoral area protection through Article 15 of the Environmental Conservation Law.

5. Fish passage in the outlet stream has not been discussed in past meetings between Corps of Engineers, Fish and Wildlife Service, and DEC. While spawning in the outlet stream has no significance for the lake the reverse may be true. Fish movement from the lake may be important for maintaining fish population in the outlet stream. This should be discussed at future meetings.

6. The most critical long range consideration is the selection of the controlling agency for lake level management and the responsibilities of that agency for enforcing lake level guidelines.

7. The report does not discuss the measures to enhance northern pike spawning at the south end of Conesus Lake through scalping. This was discussed and agreed upon at several joint meetings between U.S. Fish and Wildlife Service, Corp of Engineers, and DEC Fish and Wildlife personnel.

8. This project may provide potential for creating fishermen access at the north end of Conesus Lake. Ice fishing access is of critical concern in this area. This should be discussed during subsequent meetings.

Coordination on this project must be maintained to insure adequate protection of the valuable fish and wildlife resources associated with Conesus Lake. We have not received project documents in a timely manner. The DPR prepared by the Corp was the basis for the Coordination Act Report. We had to request that document from the Corp after it was observed printed in a local newspaper. We feel that it is premature to prepare a coordination act report based on information presented in the DPR. More informatior is needed on channel design north of Route 20A, the design of control structures, work involving wetland along the outlet, modification of the route 256 bridge, additional design alternatives and enhancement work at south end of lake.

If we can be of further assistance in insuring adequate environmental protection for this valuable resource, please feel free to contact us.

Very truly yours,

Edward D. Holmes

Edward D. Holmes
Regional Supervisor
Fish & Wildlife
Region #8

Kenneth Wich

Kenneth Wich
Director
Division of Fish & Wildlife

JGC:er

W. P. ESHBAUGH
CIVIL ENGINEER
818 WEST LAKE ROAD
GENESEO, N. Y. 14454
716-243-3000

M. AREA

December 22, 1980

Mr. Herbert W. Page, Administrator
Conesus Lake County Sewer District
Lakeville, New York 14480

Dear Mr. Page:

Pursuant to your authorization I have reviewed the six locations where the sewers cross under the Conesus Lake Outlet to determine the feasibility of lowereing them as requested by the U. S. Corps of Engineers.

Due to the terrain these sewers were installed by necessity at minimum grade and to lower them will require the use of inverted syphons or pump stations with force mains.

In view of the minimum grades and the low flows at various times I would not recommend siphons as they would soon fill with solids.

Reviewing the original cost of the twenty-six existing pump stations and adding the inflation since they were installed seven years ago, I would estimate the cost of the six additional stations with force mains and emergency generators to be in the order of $90,000 to $100,000 each.

Yours very truly,

W. P. Eshbaugh

W. P. Eshbaugh

PRELIMINARY DRAFT
For Review Purposes Only

November 5, 1980

Colonel George P. Johnson
District Engineer, Buffalo District
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

This constitutes our report on effects the flood control project on Conesus Lake, Towns of Conesus, Geneseo, Groveland, and Livonia, Livingston County, New York, would have on fish and wildlife resources. It was prepared under the authority of and in accordance with Section 2(b) of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). The project was authorized under Section 205 of the 1946 Flood Control Act, as amended.

This report has been reviewed and endorsed by the Division of Fish and Wildlife of the New York State Department of Environmental Conservation as signified by the attached letter from Director Kenneth F. Wich, dated

DESCRIPTION OF THE PROJECT

The selected plan for flood management at Conesus Lake is the 30-60 Channel Improvement and Control Structure Plan in conjunction with the Lake Level Management Plan. The proposed plan is to construct a new outlet channel at the lake which would begin about 400 feet (122 m) downstream of the private road bridge that crosses the existing outlet channel and would run through an existing trailer park to the lake (Fig. 1). The new outlet channel would be about 200 feet (61 m) in length and about 60 feet (18 m) in width. A water control structure, consisting of steel sheet-piling with eight control gates, would be located in the new lake outlet, while the existing outlet would be plugged. In addition, the existing outlet channel would be widened to a maximum of 60 feet (18 m) beginning at the downstream end of the new channel to the upstream end of the Route 20A bridge. A 4-foot (1.2 m) high, 24-foot (7.3 m) wide drop structure would be constructed about 66 feet (20 m) downstream of the Route 20A bridge. Riprap would extend from about 50 feet (15 m) upstream of the Route 20A bridge to 50 feet below the drop structure. The existing creek channel would be widened to a maximum of 30 feet (9 m) starting at the drop structure and ending at a point about 4,000 feet (1,220 m) upstream of the Route 256 bridge (just below the sewage treatment plant). Some realignment of existing channels may be undertaken during the widening process.

PLAN OF DEVELOPMENT FOR AQUATIC AND TERRESTRIAL ECOSYSTEMS

In order to protect aquatic resources, a plan should be developed by the Corps of Engineers in cooperation with and approved by the New York State Department of Environmental Conservation, the U. S. Fish and Wildlife Service, the U. S. Soil Conservation Service, and the U. S. Environmental Protection Agency, to minimize the amount of project-caused erosion, siltation, and water pollution in the outlet creek during and immediately after construction.

To mitigate the potentially adverse effects of the proposed water control structure on fish movements into and out of the outlet creek, the outlet works should be constructed in such a manner as to permit upstream-downstream fish passage during normal flow (non-flood) conditions. A plan detailing the provisions and/or facilities for fish passage through the outlet works should be prepared by the Corps of Engineers in cooperation with and approved by the New York State Department of Environmental Conservation and the U. S. Fish and Wildlife Service. All necessary structures should be incorporated into the overall design, construction, operation, and maintenance plan for this project, and they should be provided at project cost.

The morphology of Conesus Lake is typical of the Finger Lakes, but its depth (both mean and extreme) is less than any except Honeoye and Silver Lakes. The total surface area of the lake is about five square miles (12.9 km^2). Its length is about 7.8 miles (12.6 km) and its mean width is about 0.66 miles (1.06 km). The mean depth is about 35 feet (11.5 m), with a maximum depth of about 66 feet (20.2 m). The lake is dimictic and ice covers the water for about three months. In late summer, oxygen is severely depleted at extreme depth (about 66 feet; 20.2 m) but only a very small part of the bottom is affected (Forest et al., 1978).

In general, the Conesus outlet creek is small (usually less than 20 feet wide; 6.1 m) and shallow (less than two feet deep; 0.6 m) (White and Alldridge, 1980). Water flow is sluggish to slack in most areas except in the occasional poorly defined riffle. Most riffle areas are heavily vegetated with rooted aquatics. The available substrates consist of heavily silted sands, silts, and gravels. Riffle areas contain silted sands and cobbles.

Conesus Lake is considered to be Class "AA", the highest water quality category in New York's classification system (State of New York, 1967). As discussed below, the lake has a substantial northern pike fishery and it receives considerable recreational use. However, the Conesus Lake inlet creek is Class "D", the lowest water quality category, and this stream does not possess a viable fishery. The Conesus Lake outlet creek is considered to be Class "C" water, and it possesses a small, but highly diverse fish community.

The submerged aquatic flora of Conesus Lake was studied by Forest (1977) and Forest et al. (1978). They reported the following submerged plants as occurring in the lake: Ceratophyllum demersum, Elodea canadensis, Heteranthera dubia, Myriophyllum sp., Najas flexilis, Potomogeton crispus, P. nodosus, P. pectinatus, P. perfoliatus, P. pusillus, P. zosteriformis, P. gramineus, Ranunculus sp., Vallisneria americana, and Utricularia vulgaris. Forest et al. (1978) report the following emergent and floating plants from the lake: Cephalanthus occidentalis, Decodon verticillatus, Lemna minor, L. trisulca, Nuphar variegatum, Nymphaea odorata, Peltandra virginica, Polygonum amphibium, Sagittaria latifolia, S. rigida, Scirpus acutus, S. americanus, S. atrovirens, S. validus, Sparganium eurycarpum, Typha angustifolia, T. latifolia, and Wolffia punctata. Myriophyllum, Vallisneria, and Heteranthera are abundant and sometimes locally dominant, but the greatest densities have been recorded for Ceratophyllum (Forest et al., 1978). Najas flexilis and Potomogeton spp. range from common to rare. Elodea canadensis is abundant in certain restricted areas.

The fisheries of the Conesus outlet creek were studied in 1978-1979 by White and Alldridge (1980). They investigated the walleye, northern pike, and centrarchid fisheries of the lake in some detail. The important game fishes present in Conesus Lake and its tributaries include northern pike, chain pickerel, walleye, largemouth bass, and smallmouth bass. Available panfish species include the pumpkinseed, bluegill, rock bass, yellow perch, brown bullhead, and yellow bullhead. Numerous

forage fishes are also present including the common shiner, golden shiner, mimic shiner, cutlips minnow, bluntnose minnow, fathead minnow, creek chub, hornyhead chub, blacknose dace, Johnny darter, fantail darter, mudminnow, brook silverside, and mottled sculpin. While the lake once supported a significant walleye fishery (Forest et al., 1978), the stocks have steadily declined in recent years; present fishery management at the lake is geared to the more successful northern pike fishery.

In general, and as a group, amphibians and reptiles are well represented in the project area (R. Roecker, personal communication). Frogs and toads present include the spring peeper, gray tree frog, northern leopard frog, pickerel frog, wood frog, bullfrog, green frog, and American toad. Salamander species present include the slimy salamander, dusky salamander, Allegany mountain salamander, two-lined salamander, red-backed salamander, Wherle's salamander, red-spotted newt, blue-spotted salamander, Jefferson's salamander, and spotted salamander. Only two turtle species are known to occur in the lake: the midland painted turtle and the common snapping turtle. Snakes present in the area include the northern water snake, garter snake, ribbon snake, brown snake, red-bellied snake, ring-necked snake, smooth green snake, black rat snake, and milk snake.

Mammals of the watershed are represented by a diverse assemblage of species (R. Roecker, personal communication). Small mammals present include the meadow vole, white-footed mouse, meadow jumping mouse,

woodland jumping mouse, masked shrew, smoky shrew, shorttail shrew, and star-nosed mole. Bats present include the little brown bat, small-footed myotis, Keen myotis, eastern pipistrel, big brown bat, red bat, and hoary bat. Squirrels present include the eastern gray squirrel, red squirrel, fox squirrel, southern flying squirrel, eastern chipmunk, and woodchuck. Mustelid mammals include the mink, short-tailed weasel, long-tailed weasel, and striped skunk. Intermediate-sized mammals include the coyote, raccoon, red fox, gray fox, opossum, and porcupine. Also present are cottontail rabbits, beaver, muskrats, and white-tailed deer.

Waterfowl use of Conesus Lake was studied by White and Alldridge (1980), but in general the avifaunal use of Conesus Lake and environs has never been thoroughly examined. White and Alldridge (1980) reported summer use by mallards, wood ducks, and blue-winged teal. Fall and spring surveys revealed use of the lake by migrant black ducks, buffleheads, scaup, American widgeon, ring-necked ducks, goldeneye, Canada geese, loons, coot, and pie-billed grebes. There are also reports of canvasbacks, whistling swans, oldsquaws, ruddy ducks, common mergansers, great blue herons, and killdeer (Forest et al., 1978).

PROJECT IMPACTS ON AQUATIC AND TERRESTRIAL ECOSYSTEMS

The construction of a new outlet channel and the rechannelization of the existing outlet creek, as well the construction of a water control structure, would result in the potential for erosion of soil into the creek and the resuspension of bottom sediments, resulting in an increased level of turbidity in the creek in the immediate vicinity of and downstream from project construction and maintenance activities. The increased level of turbidity could then stress fish and macro-invertebrate populations, especially fish eggs and larvae, which are particularly sensitive to changes in the concentration of suspended solids. Filter-feeding invertebrates would be the most adversely affected invertebrate group. However, fish are usually more sensitive to suspended solids than are most invertebrates. The most detrimental effects would be expected to occur during and immediately following construction activities. They would be particularly adverse if construction were to take place during late spring and early summer when most fish breed (spawn) and when eggs, larvae, and young fish are developing. High suspended solids concentrations would be least harmful to fish if they were present during the winter months rather than in summer.

The construction of a water control structure, consisting of steel sheet piling and eight control gates, would inhibit to some extent normal fish movements into and out of the outlet creek. Northern pike, white suckers, and various other fish species are known to migrate to spawning areas; therefore, if the outlet structures impede their passage, either physically

or through changes in fish behavior, then reduced reproduction would likely occur for the affected species, along with change in the structure of the creek's fish community.

Rechannelization of the outlet creek and the excavation of a new outlet channel would disturb riparian vegetation that both stabilizes the creek banks and provides wildlife cover. Riparian areas would further be affected by the placement of water control structures in the creek and the abandonment of the existing outlet channel. These areas provide optimal habitat for many wildlife species such as furbearers and songbirds, thus damage to riparian areas would significantly reduce species diversity and carrying capacity in remaining habitat. Further, the loss of water in the existing lake outlet would reduce available habitat and decrease the value of adjacent habitats for many fish and wildlife species.

The manipulation of water levels at Conesus Lake would have severe adverse effects on the entire lake ecosystem if the lake level management plan did not incorporate environmental considerations. However, the Corps of Engineers, in cooperation with the New York State Department of Environmental Conservation and the U. S. Fish and Wildlife Service, have established lake level regulation criteria (Table 1; Fig. 2) that incorporate fish and wildlife considerations acceptible to the three agencies. Of primary concern are the northern pike spawning grounds in the marshes at the Conesus Lake inlet. Studies at the northern pike spawning grounds during March-May, 1979, revealed that Conesus Lake levels could be raised to a maximum spring elevation in the range of 819.5-820.0 feet and yet maintain adequate northern pike spawning

depths (White and Alldridge, 1980). This level would be maintained from March 15-April 15 in order to allow the eggs to hatch. Lake levels would then be slowly dropped during April 15-May 1 to an optimal summer level in the range of 818.0-818.5 feet. These lake levels would ensure a quality northern pike fishery in Conesus Lake. Other fish species spawning along the lake shore would be little affected by lake levels managed for northern pike. The intensive summer cottage and shoreline development around the remainder of the lake further reduces the significance of lake level management and potential for adverse effects on fish and wildlife.

The Lake Level Management Plan consists of various target levels (Fig. 2) that consider requirements for flood control, recreation, fish and wildlife, water supply, and downstream demand (e.g., waste assimilation capacity) (Table 2). During winter the lake would be lowered to provide storage for excess spring runoff which would then be released gradually to reduce flood damages. During summer, when precipitation and runoff are low, the lake would be maintained at or near the desired target levels.

DESCRIPTION OF AQUATIC AND TERRESTRIAL ECOSYSTEMS

Conesus Lake lies within the Genesee River Basin and is the westernmost of the typical Finger Lakes located in central and western New York. It lies about 22 miles (35.4 km) south of the City of Rochester and is located in the Towns of Conesus, Geneseo, Groveland, and Livonia, Livingston County, New York. The lake basin drains an area of roughly 69 square miles (178.7 km), including the lake surface, which drains through Conesus Creek to the Genesee River. The basin is in a north-south valley that is roughly rectangular in shape and about 17 miles (27.4 km) long and about 5 miles (8 km) in average width.

The banks of the rechannelized outlet creek and the banks of the new outlet channel, as well as upland areas disturbed during channel work and other construction activities, should be revegetated as soon as possible after construction to mitigate the loss of wildlife habitat. A revegetation plan should be developed for the project in cooperation with and approved by the New York State Department of Environmental Conservation and the U. S. Fish and Wildlife Service. The plan should include the monitoring of growth conditions to ensure that revegetation is successful and the replacement of dead or dying plant species. All replanting, maintenance, and monitoring activities should be funded as project costs.

The quality and quantity of fish and wildlife habitat in the section of Conesus outlet creek that would be plugged and abandoned should be maintained (a) by ensuring that all riparian vegetation associated with this area is left undisturbed or, if damaged, replaced, and (b) by installing a low-flow pipe to allow continued flow in the old creek channel.

All construction activities associated with instream or streambank areas, including the construction of a water control structure, should be restricted to a period when impacts on fish and wildlife resources would be minimal. We anticipate that the least damage to those resources would be incurred if construction were to take place during the period from July through March, when most animal breeding and rearing activities have concluded, and when surface runoff and stream flow are generally lowest.

To mitigate the potentially adverse effects of lake level management on fish and wildlife and their habitats, lake levels should be held at or near the operational levels established in cooperation with and approved by the New York State Department of Environmental Conservation and the U. S. Fish and Wildlife Service for the conservation and development of fish and wildlife resources (Table 1, Fig. 2). These criteria should be adhered to by the Corps of Engineers as long as it exercises direct operational control of project features. Any agreements entered into for the delegation or release of operational control to another agency should include stipulations to prevent deviation from these criteria.

RECOMMENDATIONS

We recommend that:

1. Prior to project construction, a plan be developed by the Corps of Engineers in cooperation with an approved by the New York State Department of Environmental Conservation, the U. S. Fish and Wildlife Service, the U. S. Soil Conservation Service, and the U. S. Environmental Protection Agency, to minimize the amount of project-caused erosion, siltation, and water pollution in the outlet creek during and immediately after construction.

2. To mitigate the potentially adverse effects of the proposed water control structures on fish movements into and out of the outlet creek the outlet works be constructed in such a manner as to permit upstream-downstream fish passage during normal flow (non-flood) conditions. We further recommend that a plan detailing the provisions and/or facilities for fish passage through the outlet works be prepared by the Corps of Engineers in cooperation with and approved by the New York State Department of Environmental Conservation and the U. S. Fish and Wildlife Service, that all necessary structures be incorporated into the overall design, construction, operation, and maintenance plan for this project, and that they be provided at project cost.

3. The banks of the rechannelized outlet creek and the banks of the new outlet channel, as well as upland areas disturbed during channel work and other construction activities, be revegetated as soon as possible after construction to mitigate the loss of wildlife habitat. We further recommend that prior to project construction, a revegetation plan be developed for the project in cooperation with and approved by the New York State Department of Environmental Conservation and the U. S. Fish and Wildlife Service, that the plan include the monitoring of growth conditions to ensure that revegetation is successful and the replacement of dead or dying plant species, and that all replanting, maintenance, and monitoring activities be funded as project costs.

4. The quality and quantity of fish and wildlife habitat in the section of Conesus outlet creek that would be plugged and abandoned be maintained (a) by ensuring that all riparian vegetation associated with this area is left undisturbed or, if damaged, replaced, and (b) by installing a low-flow pipe to allow continued flow in the old creek channel.

5. All construction activities associated with instream or streambank areas, including the construction of a water control structure, be restricted to the period from July through March, when most animal breeding and rearing activities have concluded, and when surface runoff and stream flow are generally lowest.

6. To mitigate the potentially adverse effects of lake level managment on fish and wildlife and their habitats, lake levels be held at or near the operational levels established in cooperation with and approved by the New York State Department of Environmental Conservation and the U. S. Fish and Wildlife Service for the conservation and development of fish and wildlife resources, and that these criteria be adhered to by the Corps of Engineers as long as it exercises direct operational control of project features, and that any agreements entered into for the delegation or release of operational control to another agency include stipulations to prevent deviation from these criteria.

Please continue to coordinate this project with us as it develops, and advise us of any changes or additions to the project so that consideration may be given to revise or supplement this report.

REFERENCES

Forest, H.S. 1977. Study of submerged aquatic vascular plants in northern glacial lakes (New York State, U.S.A.). Folia Geobot. Phytotax. 12:329-341.

Forest, H.S., J.Q. Wade, and T.F. Maxwell. 1978. The limnology of Conesus Lake. Pages 121-224 in J.A. Bloomfield, ed. Lakes of New York State. Vol. I. Ecology of the Finger Lakes. Academic Press, New York.

State of New York. 1967. Official compilation of codes, rules and regulations of the State of New York. Title 6. New York State Department of State, Albany.

Roecker, R. Personal Communication. State University of New York, College of Arts and Sciences at Geneseo.

White, A.M., and N.A. Alldridge. 1980. Biological Studies of Conesus Lake and tributaries, 1978-9, Livingston Co., New York. Report on contract DACW 49-78-C-0017 prepared for the U. S. Department of the Army, Corps of Engineers, Buffalo District, Buffalo, New York. 175pp.

Table 1. -- Desired lake levels for Conesus Lake, Livingston County, New York.

Criteria	Range[1]		Period	Remarks
	Upper	Lower		
Flood Control	819.5	N.A.	At all times	Level where minor flood damage begins
Recreation	819	818	Apr. 15-Oct. 15	Optimal levels for general recreational use
Fish & Wildlife	819.5	819	Mar. 1-Jun. 15	Optimal levels for northern pike spawning
Municipal Water Supply	N.A.	815	At all times	Water intakes kept at sufficient depth
Lake Outflows	-	816.5	At all times	Inadequate outflow below this level
Winter storage	-	816.5	Nov. - Jan.	Level necessary to provide storage capacity for flood control

[1]Elevations in feet.

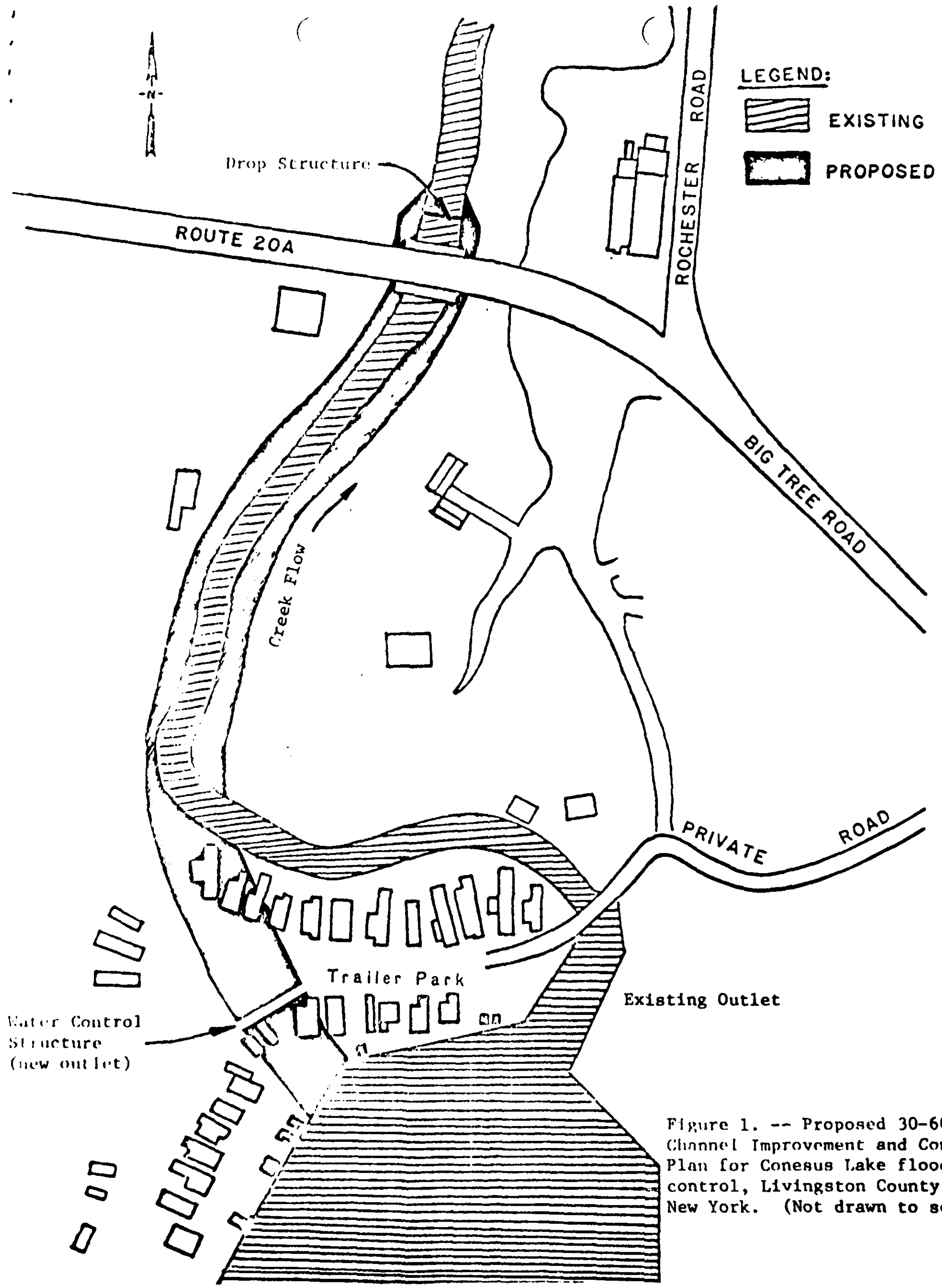


Figure 1. -- Proposed 30-60 Channel Improvement and Control Plan for Conesus Lake flood control, Livingston County, New York. (Not drawn to scale)

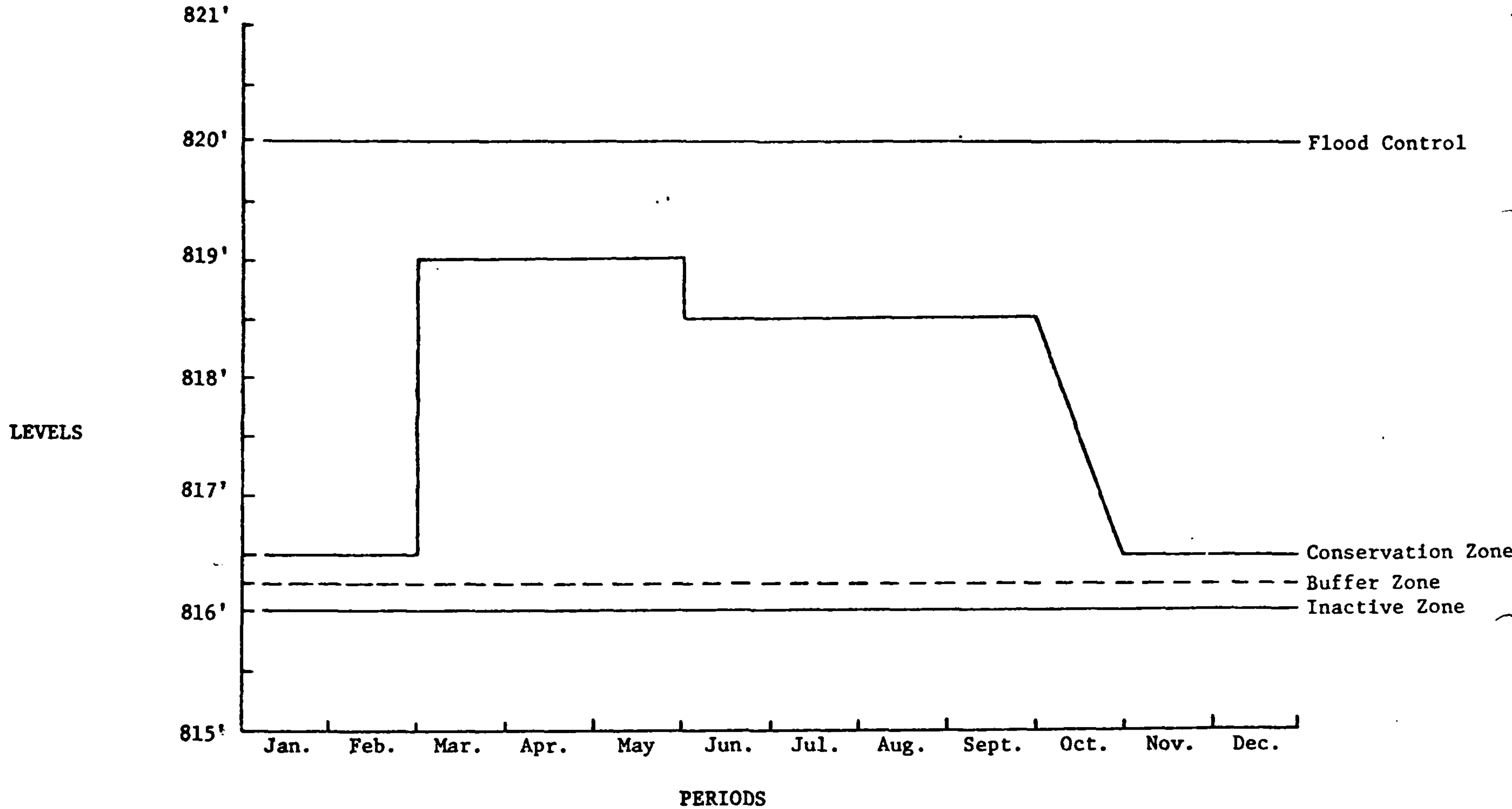


Figure 2. -- Proposed target levels for Conesus Lake flood control, Livingston County, New York.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

HARRISBURG AREA OFFICE
100 Chestnut Street, Room 310
Harrisburg, Pennsylvania 17101

October 31, 1980

Mr. Donald M. Liddell
Chief, Engineering Division
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Liddell:

This responds to your letter (NCBED-PE) of September 30, 1980, requesting information on the presence of threatened or endangered species or critical habitat in the areas of three flood control projects: (1) Irondequoit Creek, Penfield, Monroe County, New York; (2) Oneida Creek, Oneida, Oneida and Madison Counties, New York; and (3) Conesus Lake, Livingston County, New York.

Except for occasional transient species, no federally listed or proposed species under our jurisdiction are known to exist in the project impact areas. No critical habitat has been designated in New York. Therefore, no Biological Assessment or further Section 7 consultation under the Endangered Species Act is required with the Fish and Wildlife Service (FWS). Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to endangered or threatened species under our jurisdiction. It does not address other FWS concerns under the Fish and Wildlife Coordination Act and other legislation.

A compilation of federally listed endangered and threatened species in New York is enclosed for your information.

Sincerely,

Norman R. Chupp

Norman R. Chupp
Area Manager

Enclosure

Conesus Lake Association Inc.
P.O. BOX 79, LIVONIA, N.Y. 14487

October 31, 1980

Mr. Charles Zernentsch
U. S. Army Corps of Engineers, Buffalo Dist.
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Zernentsch:

In supplying the enclosed figures, the Conesus Lake Association has complied with your department's request for an update on property valuation, relative to the Conesus Lake Outlet project.

The figures, of course, reflect the 100% assessment program that became effective in September 1980.

We submit the following figures for that property surrounding the lake, broken down into the four towns. Every attempt was made to exclude such property that did not contact the shoreline or was at such an elevation as to escape flooding/damage.

Town	Assessment
Conesus	$12,053,200
Geneseo	13,600,100
Groveland	7,901,100
Livonia	32,304,200
Lake Property - Total	$65,858,600

Although extremely difficult to compare present values with those informally gathered about four years ago, there is much to indicate that home values on the lake have not only risen sharply because of the inflation factor, but also because of increased owners investment. The large increase in taxes following the 100% re-evaluation has further upset the residents.

All this dictates that a strong and effective flood control project be completed as soon as possible to protect these investments.

Sincerely,

James A. Culliton, m

James A. Culliton, President
Conesus Lake Association

cc B. Conable
J. Emery
Town Boards of Conesus, Geneseo, Groveland, Livonia

Conesus Lake Association Inc.
P.O. BOX 79, LIVONIA, N.Y. 14487

October 27, 1979

Study Manager Anthony R. Eelman
U. S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Tony:

Again I wish to thank you and your associates for their cooperation at the recent hearing. As I stated at the meeting, we are indeed enthused!

With regard to the information needed list you gave me - the following is submitted:

1. I gave you a directory. There are 890 year-round addresses and 828 summer residents.

2. We have written our members for additional damage estimates.

3A. The existing control structure is operated by the Association Water Level Committee. We hire Bob Coykendall Bait Shop to do the actual removal of the flash boards.
B. It has never been replaced.
C. All records of operation are being furnished by Kay Conlon.

4. Water supply information can be obtained as follows: Geneseo Water Works, %Geneseo Village Clerk, Geneseo, NY 14454; Avon Water Plant, %Avon Village Clerk, Avon, NY 14414; Lakeville Water District, %Livonia Town Hall, Livonia, NY 14487. It is our understanding that these plants may have sustained damage during recent floodings, also. When you correspond with them, we suggest you request this info.

5. There are about 2000 motor boats of lengths varying from 10 feet to 25 feet and from 3/4 H.P. to in excess of 200 H.P. There are also about 1000 sail boats that regularly use the lake.

If you need any other information, please let me know.

Sincerely,

Donald H. Auble, jm

DHA:jfm

Donald H. Auble, President
Conesus Lake Association, Inc.

NCBED-PN 17 September 1980

Katherine A. Conlon, Chairman
Water Level Commission
Conesus Lake Association, Inc.
P.O. Box 79
Livonia, NY 14487

Dear Ms. Conlon:

Thank you for your letter of 28 August in which you stated the Board of Directors preference for the 30-60 Plan.

In response to the additional questions you posed, we would like to offer the following comments:

Sand bar removal - Since the bottom sill of the control structure will be located at Elevation 816, we do not anticipate any problem with the sand bar.

Utilizing the upland marsh as a holding pond - This marsh is owned by the New York State Department of Environmental Conservation (NYSDEC). It is an important area for fish spawning and wildlife habitat. We were required to do extensive coordination and research to assure that the project would not significantly impact on the marsh. NYSDEC would oppose any changes that would affect the natural processes in this marsh. In addition, operating this area for upland storage could make the operator liable to lawsuits from lake residents, particularly in those years of low lake levels or flooding.

Avon water line - This line will be relocated in the 30-60 Plan. However, the cost of this relocation and the cost of the sewer work will be a local responsibility.

Use of our lake model to evaluate lake stagnation - The model we have developed is a mathematical hydrologic model which is a computer representation of the lake system. It is not a physical model nor does it include parameters which might be used to evaluate changes in the lake's shoreline. We are using the computer model to predict the elevations of the lake for different combinations of rainfall and snowmelt.

NCBED-PN
Katherine A. Conlon, Chairman

SS/2247

If we can be of any further assistance, please do not hesitate to call.

Sincerely,

CHARLES E. GILBERT
Chief, Planning Branch

CF:
NCBED-PN
NCBED-HI

Zernentsch
Kelly
Price
Coniglio
Gilbert
Hallock
Liddell

P.O. BOX 79, L. ɔNIA, N.Y. 14487

August 28, 1980

U. S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Attn.: Mr. Charles Zernentch
Subject: Conesus Lake Flood Control Project

Dear Mr. Zernentch:

In regard to your informational letter of July 18, 1980 re the Conesus Lake Study, the Conesus Lake Association Board of Directors held a meeting to discuss the information and passed a resolution in favor of Plan 30-60.

The reason is that Plan 30-60A does not indicate any changes of and around the private bridge at the mouth of Conesus Creek. This bridge has been an impediment to water flow during flood conditions in the past as well as a collecting point of much debris. Also, we feel that the extreme S curves would occasion collecting points for sand and sediment bars which would make the maintenance of the creek more costly in time and monies.

The Plan 30-60 proposed new channels appears to circumvent all of these problems and leave no impediments south of the proposed control structure.

We note the absence of remarks concerning the sand bar build-up approximately 300 feet south of the entrance to Conesus Creek. After the flood of 1972, the Corps of Engineers recommended a dredging and clean-up of the creek itself and that the sand bar should be cut with a 40-foot wide channel. This was done and the channel filled itself in during the following summer (1979). Do you now feel that this is no longer viable or is study continuing in this area?

In regard to the "holding" pond theory at the south end of the lake, we would appreciate your comments on paper for our records as many of our members still believe in the idea of a water reservoir to maintain more consistent levels.

One last item we noted was not discussed. The presence of the Village of Avon water line which crosses Conesus Creek north of the treatment plant. We have had several elevations of the top of this line but none that we can call "official". Many believe

that it impedes water flow and I have personally been involved in removing debris from this obstruction. We would ask that you consider the lowering of this line by the Village of Avon.

We understand that a "working model" of the project has been constructed. We have one other problem at the north end of the lake that does not pertain to flooding but to stagnation. Perhaps you could do us a favor by conducting some tests on your "model". Just east of the Conesus Creek entrance is a prominence known as Sand Point. It was "man-made" circa 1898 for a railroad spur which brought passengers to the steamboat landing area. We now believe that this point interferes with water circulation east of the point therefore creating little or no motion of flow to the outlet. We would suggest three tests; perhaps with a color dye to show circulation; first, with the point intact to represent present conditions, second, with a channel cut through the point as a continuation of the shoreline east of the point and third, with the point totally removed.

If these tests proved the theory, we realize that it is not a portion of your project and we would not expect federal funds to accomplish the purpose. However, the information would be invaluable to us.

As to the other information you have requested - development from area planning boards, year-round residents and photos - we are in the process of collecting data. Since Livingston County has recently been re-evaluated to 100% assessment, perhaps we can obtain more current property values for you. We are also contacting the Conesus Lake Sewer District in regard to the necessary adjustments to the sewer lines in Conesus Creek and will keep you up-dated as to progress.

We appreciate the opportunity to be of service to the Corps in these matters and please feel free to contact us for any help we can supply.

Sincerely,

Kay Conlon, Sr

Katherine A. Conlon
Chairman, Water Level Comm.

KAC:jfm
Hon. Barber B. Conable, Jr.
P. DeMartini, Conesus Compact Chmn.
R. Ridley, Acting Pres. C.L.A.

Conesus Lake Association Inc.
P.O. BOX 79, LIVONIA, N.Y. 14487

October, 1979

Dear Conesus Lake Resident,

On October 25, 1979, at 7:30 P.M., there will be a public hearing in the Livonia Middle School Auditorium. The hearing is being held by the U.S. Army Corps of Engineers.

As you know, this Association has been involved for over forty-five years in attempts to solve the "ups and downs" of the water level problems on Conesus Lake.

The purpose of this public hearing is for the Corps to get input from the residents of the area. We urge you to attend this hearing and to participate with your views and experiences.

Before the Corps can proceed, they must determine if a project will be "cost effective". Obviously, the benefits must outweigh the cost. Current newspaper articles have indicated that, perhaps, the Corps has doubts about the cost effectiveness. If you have had damage to your property because of water level - - - tell them about it.

The Association has furnished the Corps with what information it has, but it is not complete. We must give them as much factual information as we can. Your attendance at this hearing can be one of the most significant contributions you can make toward the achievement of the goals of this organization. Please - please attend.

Sincerely,

CONESUS LAKE ASSOCIATION, INC.

Donald H. Auble

Donald H. Auble
President

TOWN OF GENESEO

Planning Board

119 MAIN STREET
GENESEO, NEW YORK 14454

October 15, 1980

Mr. Charles Zernentsch
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Zernentsch,

I am writing to you in regard to a request the Geneseo Town Planning Board received from the Conesus Lake Association, asking our board for a report as to the anticipated development in the "flood plain" and surrounding areas that might be generated by the opening of the Genesee Expressway.

The board feels that the lack of available development land itself will certainly limit much more building on the shores of the lake. Within the last five years over 20% of the summer homes have been converted into year round homes and the lake as a whole has about 60% year round homes on it. This of course has increased the value of these properties and this is important to the Town of Geneseo as far as our tax base. Flood control is of utmost importance to help protect the residents as their investment in their land is certainly far more then it was in former years.

As far as what impact we would have with the opening of the Genesee Expressway, it is a little to early to tell. Our board is concerned with future development on the hillside around the lake and has had requests for information in developing these areas. As many streams and creeks empty into the "flood plain" we are concerned with run off from any large developments and its effect on the lake itself. In future planning for the Town of Geneseo, this board is very aware of the problems that could occur if we do not look into every aspect of development on and around the "flood plain". We feel it is of utmost importance that everything be done to protect the lake and it's surrounding areas for economically it is a very important area to the Town of Geneseo.

Sincerely,

E. M. Emery

E. M. Emery
Chairman
Geneseo Town Planning Board
Geneseo, New York 14454

CC: Conesus Lake Association
Geneseo Town Board
Fred McCutchen, Livingston County Planning Board
Paul DeMartini

TOWN PLANNING BOARD
CONESUS, NEW YORK 14435

October 8, 1980

Mr. Charles Zernentsch
U.S. Army Corps of Engineers, Buffalo Dist.
1776 Niagara Street
Buffalo, N.Y. 14207

Dear Mr. Zernentsch:

The Conesus Planning Board has reviewed your request for information on the anticipated development in the flood plain and surrounding areas in the Town of Conesus, as a result of the opening of the Genesee Expressway. We offer the following information for your consideration:

1) The flood plain in the Town of Conesus is already highly developed. It can support little more development, because there is very little land available.

2) The remainder of the flood plain area in Conesus is under the control of the New York State Department of Conservation, and cannot be developed.

3) Economic considerations, and the opening of the Expressway may result in some existing structures in the flood plain being converted from summer cottages to permanent residences. These properties would probably be of greater value, and also residents would live along the shore during common flooding periods.

4) The possible growth in "surrounding areas" is difficult to ascertain. New housing starts have dropped in the past year in Conesus; we believe that economic and energy considerations are the cause. We cannot anticipate whether the attraction of scenic, rural building sites will again be strong once the Expressway is opened.

According to the 1980 preliminary census results, housing starts in Conesus were up 12% since 1970, with a population increase of 26%. We do not know if the decrease in housing starts in 1980 is a temporary situation, or if the growth of the 1970's has leveled out.

Please contact me if there are further questions.

Sincerely,

Marcia R. Faulkenberry

Marcia R. Faulkenberry
Chairman, Conesus Planning Board

cc. Conesus Lake Association
Paul DiMartini

Ld/2175

NCBED-PE

5 September 1980

Mr. Paul Hamilton
U. S. Department of the Interior
Fish and Wildlife Service
100 Grange Place, Room 202
Cortland, NY 13045

Dear Mr. Hamilton:

The information enclosed is to supplement the information previously provided by our 19 August 1980 letter regarding the Section 205 Flood Control project for Conesus Lake, New York. This information does not represent a significant change from that previously provided, but is a refinement which should aid in the preparation of the Fish and Wildlife Draft Coordination Act Report.

Please feel free to contact us if additional clarification is required.

Sincerely,

1 Incl
as stated

CHARLES E. GILBERT
Chief, Planning Branch

CF:
NCBED-PN/Zernentsch
NCBED-PE/Lewis

Lewis_______
Bennett______
Pieczynski___
Zernentsch___
Kelly_______
Gilbert______
Hallock/
Liddell______

Livingston County Planning Board

BLDG. NO. 2, COUNTY CAMPUS
MT. MORRIS, N. Y. 14510

F. D. McCUTCHEN
PLANNING DIRECTOR
716-658-2881, EXT. 34

October 2, 1980

Mr. Charles Zernentsch
U.S. Army Corps of Engineers Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Subject: Conesus Lake Flood Control Project

Dear Mr. Zernentsch:

The Conesus Lake Association has notified this office that you have requested comments from the Livingston County Planning Board concerning anticipated development in the flood plain and surrounding areas that might be generated by the opening of the Gensee Expressway.

The Planning Board discussed this subject at its September 11 meeting and asked me to respond to your request. It was noted at the meeting that we do not have any hard and fast data to offer at this time. Instead, we can only give you our general assessment of future development around the lake and its possible impact.

Development around Conesus Lake during the seventies was given a significant boost with construction of the lake perimeter sewer. A second tier of housing development ensued during this period, and there was a distinct trend of summer cottages being converted into permanent, year-round homes (first tier around lake). It is estimated that the peak summer population around the lake may be approaching 15,000.

Construction of the Genesee Expressway which passes nearby the lake's northern end, and includes two interchanges at Routes 15A and 15, will result in further development around the lake in the Planning Board's opinion. The current controversial proposal by SEL Properties to rezone 120 acres in the Lakeville-Geneseo area for business purposes is an indication of the type of development pressures we can anticipate as a direct result of the expressway.

It is expected that the expressway will not only stimulate new commercial development within the drainage basin of Conesus Lake, but also encourage limited industrial development and related housing construction. Corporate executives from industrial firms in Rochester can be expected to look more favorably on a building site overlooking Conesus Lake as the commuting time is significantly reduced by the expressway.

The Planning Board has expressed concern over not only what the impact of additional growth around the lake will mean to potential flood problems, but also what impact it may have upon the quality and quantity of consumable water which communities such as Avon, Geneseo, Livonia and York now utilize.

Sincerely,

Fred D. McCutchen

Fred D. McCutchen
County Planning Director

FDM/pjn

cc: Conesus Lake Association
Paul DeMartini
Ernest LaVigne

P.O. BOX 79, L( )NIA, N.Y. 14487

August 28, 1980

Board of Managers
Conesus Lake County Sewer District
Box 396
Lakeville, New York 14480

Gentlemen:

In regard to the letter from the U. S. Army Corps of Engineers dated July 18, 1980 (copy enclosed), we would call your attention to the paragraph marked in red.

In a recent telephone conversation between Mr. Zernentsch and Kay Conlon, our Water Level Committee Chairman, Mr. Zernentsch was deeply concerned about the necessary adjustments to the sewer trunk lines located in Conesus Creek. He was quite insistent that funds for this work cannot be obtained as a part of the project and must be provided by the Sewer District itself.

Mr. Zernentsch stated that the sewer pipe crosses the creek in six places and must be moved to a lower elevation at an approximate cost of $100,000. He also said that the Corps could do the work and bill the cost back to the Sewer District or the District could do the work themselves prior to the start of the Corps construction.

It was also suggested that perhaps some form of "grant" funds might be available through EPA, Pure Waters or similar agencies. Therefore, we would like to suggest that the Sewer District consult its engineer and contact the County Grantsman to see if such funds are available. If not, it would mean further charges to the users.

In any event, these trunk lines must be moved or the Corps will terminate the entire flood control project and the responsibility will again fall to the four adjacent towns.

We cannot over-emphasize the importance of this issue and would appreciate your immediate attention. We would also appreciate periodic up-dates in this matter for our files. If there is any assistance we may provide to the District, please feel free to call on the Association.

Sincerely,

Robert Ridley, Jr.

Robert Ridley, Acting President

RR:jm
cc CZernentsch

P.O. BOX 79, L[illegible]NIA, N.Y. 14487

August 28, 1980

To: Mr. Fred McCutchen, Livingston County Planning Board
Town of Conesus Planning Board
Town of Geneseo Planning Board
Town of Groveland Planning Board
Town of Livonia Planning Board

Ladies and Gentlemen:

As you know, the Conesus Lake Association is deeply involved with the U. S. Army Corps of Engineers and their project of flood control for Conesus Lake.

Primarily, our duties consist of supplying them with information regarding damage evaluations, records of water level, weather conditions, comments and feelings of our membership, etc. At this time, the Corps has requested information from the Livingston County Planning Office and the Planning Boards of the four towns adjacent to the Conesus Lake shoreline. The request is for a report from your Planning Board as to the anticipated development in the "flood-plain" and surrounding areas that might be generated by the opening of the Genesee Expressway.

This information is a necessary part of the economic feasibility portion of justifying the project. Unless this justification is accomplished, the project will be terminated and once again the cost of flood control and outlet maintenance will revert to the Towns of Conesus, Geneseo, Groveland and Livonia.

We cannot over-emphasize the importance of your report and would appreciate your efforts to make this a priority item.

Sincerely,

Robert Ridley, jm

Robert Ridley, Acting President
Conesus Lake Association

RR:jm
cc Hon. Barber B. Conable Jr.
C. Zernentsch
P. DeMartini
K. Conlon

Note: Please send reports to Mr. Charles Zernentsch, U. S. Army Corps of Engineers Buffalo District, 1776 Niagara Street, Buffalo, New York 14207 with copies to the Conesus Lake Asociation Box 79, Livonia, New York 14487 and Mr. Paul DeMartini, Livonia, New York 14487.

NCBED-PE 19 August 1980

Mr. Paul Hamilton
U. S. Department of the Interior
Fish and Wildlife Service
Room 202
100 Grange Place
Cortland, NY 13045

Dear Mr. Hamilton:

This letter and enclosed Draft Preliminary Report pertain to the proposed Section 205 flood control project for Conesus Lake, NY. This draft report describes both the new channel (30/60) and in channel (30/60A) plans which are being considered at this time. The 30/60 plan has been selected by the District as the preferred plan. Any significant modifications to these plans will be forwarded to you as soon as possible. The only other plan considered was the No Action plan, which did not meet the planning objectives of the study.

These descriptions are to be used when preparing the Fish and Wildlife Coordination Act Report, the draft of which is scheduled for completion by 20 October 1980.

Please feel free to contact us if additional clarification is necessary.

Sincerely,

1 Incl
as stated

CHARLES E. GILBERT
Chief, Planning Branch

CF:
NCBED-PM/Zernentsch
NCBED-PE/Lewis

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PE

21 July 1980

Paul Hamilton, Field Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
100 Grange Place
Room 202
Cortland, NY 13045

Dear Mr. Hamilton:

This letter will confirm a 16 July 1980, telephone conversation between your Staff Biologist, Peter Petokas, and Mr. Philip Frapwell (COE), regarding the Fish and Wildlife Service's Coordination Act Report input on the Conesus Lake Project.

Mr. Petokas was informed that the Corps Study Manager, Charles Zernentsch, would not be able to submit alternative plans and a preferred plan early enough for your office to complete a Draft Coordination Act Report by the end of August 1980, as originally scheduled. Mr. Frapwell indicated that the Corps Study Manager would submit those plans to your office by 18 August 1980. Therefore, Messrs. Petokas and Frapwell mutually agreed to change the due date for completion of the Draft Coordination Act Report from 31 August 1980, to 20 October 1980, and completion of the Final Coordination Act Report from 31 October 1980, to 15 December 1980.

If these dates are not acceptable, please contact either Mr. Philip Frapwell or Mr. Leonard Bryniarski before 28 July 1980.

Sincerely,

JAMES M. BENNETT, Chief
Environmental Resouces Section

July 18, 1980

CONESUS LAKE

Good News: In the months since we last contacted you, we have continued to develop and refine a lake level regulation plan to reduce flood damages on the Conesus Lake Study. In that time, we have also reduced the number of control structure alternative plans being considered to just two. These plans are briefly described and illustrated on the attached sheets. Within the next three weeks, we will be selecting the preferred control structure plan and would like to consider your concerns and comments in our selection. Some of the factors that will affect our selection are: adequacy in providing levels of flood protection, cost of construction, impacts to fish and wildlife resources, impacts on residents and community resources, and other general environmental concerns.

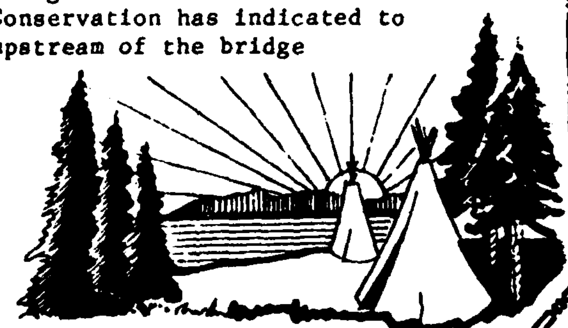
Although the two plans are described on the attached illustrations both plans have several features which are not evident on the illustrations.

1. Both would require relocation of the sanitary sewer which follows the outlet to the treatment plant. By law the cost of this work must be paid by what we term the local cooperator. Although the New York State Department of Environmental Conservation is the local cooperator, we would expect them to seek to recover this cost from the communitites protected.

2. The channel improvements shown in the illustrations may appear to be inadequate in dimension. We are using the lakes natural ability to store water, which allows us to reduce the capacities and dimensions of the structural facilities. This reduction will improve the chance of early construction, and will not affect the level of protection provided.

3. Improvements to the Route 256 Bridge (Millville Dam) will only be done if our computations show that the existing structure can not safely pass the designed flow. The New York State Department of Environmental Conservation has indicated to us that they would like the marsh upstream of the bridge maintained, whenever possible.

Please mail your comments to Mr. Charles Zernentsch's attention at the address below.



U.S. ARMY ENGINEER DISTRICT, BUFFALO
1776 NIAGARA STREET
BUFFALO, N.Y., 14207

ALTERNATIVES
CONESUS LAKE

Both alternatives I and II termed (30-60) and (30-60)A plans are identical form a point about 400 feet below the outlet down to the Route 256 Bridge. The terms 30 and 60 refer to the improved channel widths of the alternatives. As indicated both alternatives have the same size channel width, the only difference being their alignment.

The (30-60)A plan follows the existing channel downstream from a control structure which will be located near the private road bridge at the mouth of the outlet. The control structure will most likely consist of steel sheet piling with 8 control gates. A 60 foot wide trapeziodal channel will be excavated beginning downstream of the private bridge and ending just upstream of the Route 20A Bridge. A 4-foot high 24-foot wide drop structure will be constructed about 66-feet downstream of the Route 20A Bridge. Riprap will probably extend from about 50-feet upstream of the 20A bridge to 50-feet below the drop structure. A 30-foot wide trapeziodal channel will be constructed from the drop structure to a point about 4,000 feet upstream of the route 256 Bridge (just below the sewage treatment plant). Both the 30 and 60-foot wide channels will follow the existing channel alignment as much as practical. Modifications to the 256 Bridge will only be undertaken if the existing three pipes through the bridge cannot be operated to safely handle the flow.

The (30-60) plan is identical with the (30-60)A plan except it will require the construction of a new channel to the lake which will start about 400 feet downstream of the private road bridge and run thru the trailer park on the lake. The alignment shown on the sketch is for illustration and although it is intended to be representative of the proposed alignment it is not drawn to scale. The length of this new 60-foot wide channel would be about 200 feet. The control structure would be located in the new channel and the existing channel would be plugged. Consideration will be given to installing a low-flow pipe to allow some flow to continue in the old channel. The channel below this new cut will be identical with the (30-60)A plan.

CONESUS LAKE
DRAFT PRELIMINARY REPORT
FISH AND WILDLIFE COORDINATION

Background: In the plan formulation for the Conesus Lake Flood Control Project, the following were some of the factors that were given consideration:

a. Effects of lake regulation on fish and wildlife.

b. Maintenance of a recreation pool.

c. Integrating maximum flood protection with the natural behavior of the lake.

d. Providing for water supply.

e. Providing sufficient discharge for waste assimilation in the outlet.

Action: We prepared a detailed biological report of the lake, which was forwarded to you for review. We also did extensive coordination with the New York State Department of Environmental Conservation's Fish and Wildlife Section, Avon, NY (NYSDEC, F&WS). We directed specific attention to their marshes at the north end of the lake and are proposing to do some work in the marsh adjacent to the lake to maintain spawning habitat for the production of Northern pike. We and NYSDEC agreed that lake regulation will not have a significant effect on the southern marsh (below Sliker Road).

Plan: The proposed improvements are two-pronged:

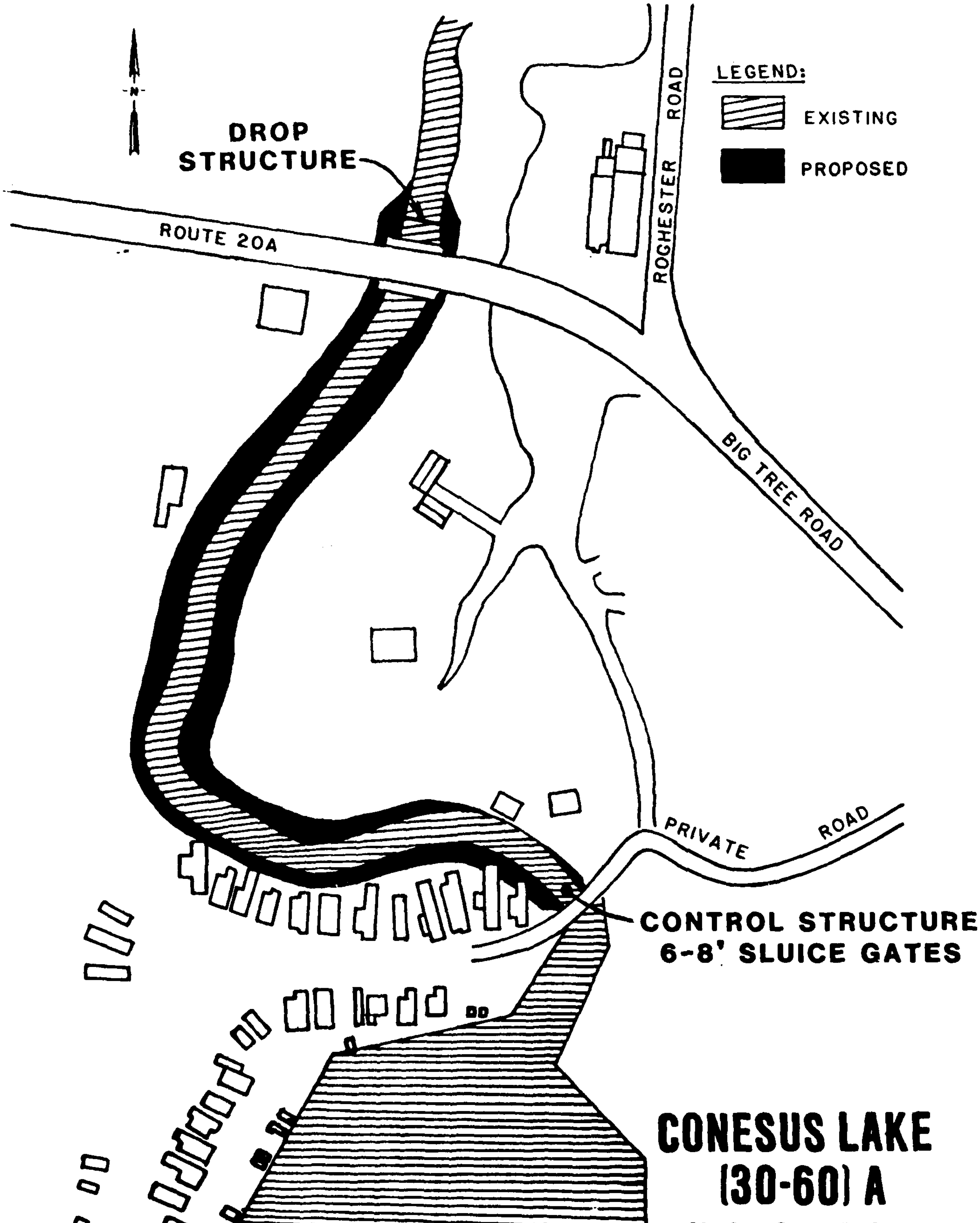
a. Utilize the Natural Fluctuation of the Lake to Store Runoff - Under existing conditions, Conesus Lake fluctuates from a low of 815 to 817 in the fall and winter, to a high of 818 to 820+ in the spring and early summer. It is our intention to plan the releases during the winter to anticipate the snowmelt and spring runoff so that most of the runoff can be stored in the lake and released gradually. The lake would be lowered to about 816 in years when there is a heavy snowfall in the basin. In most lean years when there was insufficient precipitation to raise the lake under existing conditions, we would be able to raise the lake for the spring spawning and summer recreational levels. We are using an elevation of 819 as a spring target and anticipate doing some minor grading in NYSDEC's south marsh, adjacent to the lake. This will allow for a more consistent Northern pike spawning habitat even if the water level does not reach this target level.

b. Improve the Outlet and Install a Control Structure - Improvements to the outlet are necessary to allow the safe passage of the design discharge and adequate control of the lake. The channel improvements are particularly important during the spring and summer months when the lake is high for recreation. The following are the two alternatives we have carried from Stage 2. Each alternative is accompanied by a sketch which depicts the actual topography of the area. Both Alternatives I and II, termed (30-60) and (30-60)A plans, are identical from a point about 400 feet below the

outlet down to the Route 256 Bridge. The terms 30 and 60 refer to the improved channel widths of the alternatives. As indicated, both alternatives have the same size channel width, the only difference being their alignment.

The (30-60)A plan follows the existing channel downstream from a control structure which will be located near the private road bridge at the mouth of the outlet. The control structure will most likely consist of steel sheet-piling with eight control gates. A 60-foot wide trapezoidal channel will be excavated beginning downstream of the private bridge and ending just upstream of the Route 20A Bridge. A 4-foot high, 24-foot wide drop structure will be constructed about 66 feet downstream of the Route 20A Bridge. Riprap will probably extend from about 50 feet upstream of the Route 20A Bridge to 50 feet below the drop structure. A 30-foot wide trapezoidal channel will be constructed from the drop structure to a point about 4,000 feet upstream of the Route 256 Bridge (just below the sewage treatment plant). Both the 30 and 60-foot wide channels will follow the existing channel alignment as much as practical. Modifications to the Route 256 Bridge will only be undertaken if the existing three pipes through the bridge cannot be operated to safely handle the flow.

The (30-60) plan is identical with the (30-60)A plan except it will require the construction of a new channel to the lake which will start about 400 feet downstream of the private road bridge and run through the trailer park on the lake. The alignment shown on the sketch is for illustration and although it is intended to be representative of the proposed alignment, it is not drawn to scale. The length of this new 60-foot wide channel would be about 200 feet. The control structure would be located in the new channel and the existing channel would be plugged. Consideration will be given to installing a low-flow pipe to allow some flow to continue in the old channel. The channel below this new cut will be identical with the (30-60)A plan.



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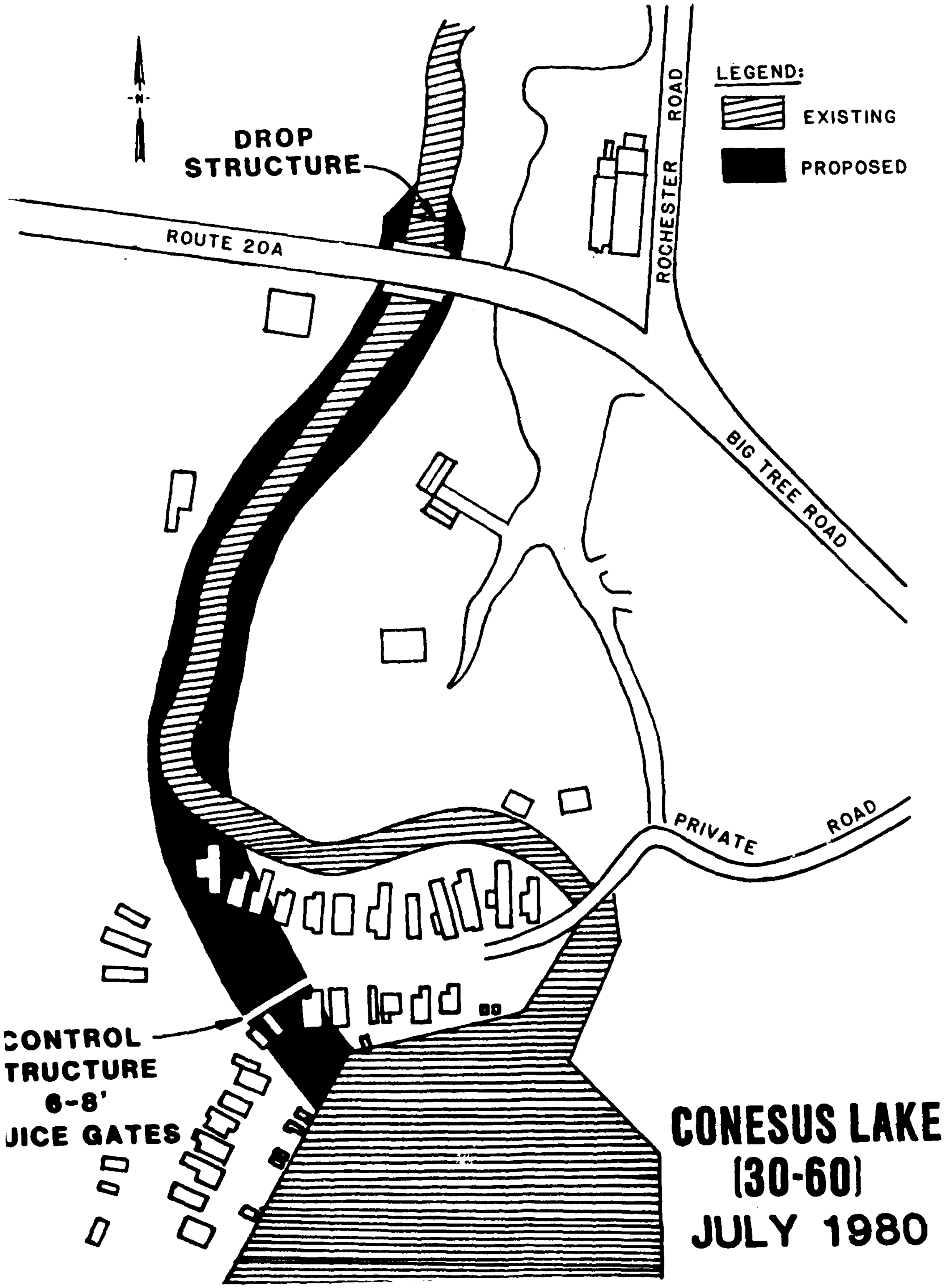
JULY 1980



CONESUS LAKE
(30-60)
JULY 1980

NCBED-PH

23 June 1980

James F. Kelley, Chief
New York State Department of Environmental
Conservation
Division of Water, Flood Protection Bureau
50 Wolf Road
Albany, NY 12233

Dear Mr. Kelley:

I agree that it is important to keep your office informed, as the coordinator of all non-Federal interests on flood protection project planning and development. This subject was further discussed in my recent telephone conversation with you.

As requested in your 29 May letter, we have enclosed for your use, pertinent correspondence regarding the Conesus Lake, Stage III DPR, which was not previously sent to you.

Based on our latest meeting with your Region 8 personnel on 23 May, memo dated 5 June 1980, (Incl 1), it appears that we have completed F&WL coordination and that Region 8 will be supporting the project. Paragraph 5 of this memo discusses an "EQ" alternative that we are considering. This would require some minor grading of the south marsh to insure the proper flooding for northern pike spawning. In addition, the concept of managing the lake for storage should result in an environmental enhancement in addition to providing the necessary flood protection benefits. Also of importance is that the channelization will probably result in several sanitary and at least one water line relocation. These relocations would cost about $100,000 to $200,000 and would be a local cost.

AD-A115 570 CORPS OF ENGINEERS BUFFALO NY BUFFALO DISTRICT F/G 13/2
STAGE III DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STAT--ETC(U)
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NCBED-PN
James F. Kelley, Chief

If you have any further questions regarding the Conesus Lake DPR, please feel free to contact Mr. Zernentsch directly.

Sincerely,

CHARLES GILBERT
Chief, Planning Branch

7 Incl
1. DF dtd 5 June 1980
2. Ltr to Edward Holmes dtd 21 May 1980
3. DF dtd 4 April 1980
4. Memo to James F. Kelley dtd 3 July 1977
5. NYSDEC ltr dtd April 8 1980
6. NYSDEC ltr dtd April 30 1980
7. Conesus Lake Alternatives dtd 12 June 1980

CF:
NCBED-PN

New York State Department of Environmental Conservation
6274 E. Avon-Lima Rd., Avon, N.Y. 14414

Robert F. Flacke
Commissioner

Eric A. Seiffer
Regional Director

June 10, 1980

Mr. Charles Zernentsch
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Chuck:

The recent interagency meeting held in our office on 5/23/80 was very informative and resolved many of the problems we had with the lake level/marsh water level relationships between Conesus Lake and the wetland south of Slicker Hill Road. If lake level regulation will not affect water levels in the marsh as outlined in the recent letter from Daniel Kelly 5/21/80, further biological studies south of Slicker Hill Road should not be required. We would, however, appreciate receiving copies of the two engineering assessments discussed in Mr. Kelly's letter.

Phil Frapwell requested information on acreage of marsh needed for enhancement of northern pike spawning which may be lossed through project development. Bill Abraham has estimated that 20 acres would be a maximum figure for marsh enhancement based upon data from a managed marsh in Michigan. The design for marsh enhancement should be worked out during the later design phases of the proposed project.

As pointed out at the meeting, the biological study conducted in the wetland along Conesus Outlet (north end of lake) under estimated the ecological value of this area because of the low water conditions existing As a result of the wier being removed from the Millville Dam. Under normal conditions the wier is functioning to create a sizable wetland along the creek heavily utilized by furbearers and waterfowl. We strongly recommend that any flood control project at the north end of the lake maintain the Millville Dam or that the dam be upgraded and guidelines established for controlled release. We also recommend minimizing the amount of dredging north of the Lakeville Sewage Treatment Plant to avoid impacting the wetland. Some sort of mitigation or enhancement work in the wetland may be able to improve hydraulic characteristics of the outlet while improving the wetland. Alternative Plan 3 presented at the public workshop 25 October 1979 may be acceptable with modifications as outlined above.

Lake level management which avoids large fluctuations and maintains water levels at or near 819 will likely not significantly impact fish and wildlife resources. The most critical water level periods will be during fish spawning. If the management plan adequately protects the requirements of each species, the Division of Fish and Wildlife could accept lake level regulation.

Very truly yours,

J. Cooper

Jack G. Cooper
Habitat Protection Biologist
Region #8

JGC:er
cc: Paul Hamilton - USFWS
James Kelly, Chief Water Mgmt. Group

Conesus Lake Association Inc.

P.O. BOX 79, LIVONIA, N.Y. 14487

June 7, 1980

Mr. Charles Zernentsch
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Subject: Summer Water Level for Conesus Lake

Dear Mr. Zernentsch:

In reply to your request for a recommendation of a summer water level for Conesus Lake, we feel that this subject is, perhaps, one of the most difficult decisions to be made and must be judged from various viewpoints.

All the printed maps we have come across indicate that Conesus Lake is 818.00 feet above sea level and it can thereby be assumed that this figure is the median abetween dry and wet spells of a given year. Therefore, it is logical to establish this point as desirable. The Association weir at Route 20A in Lakeville was operated at or around 818.00 f.a.s.l. during the summer of 1979 and we received numerous complaints from residents at the north end and those living on the south sides of various points (i.e., Eagle Point, Old Orchard Point, Long Point, etc.) that the water was too low and prohibited the use of motorboats and swimming facilities. We also received complaints from the north end of a dense growth of filamentis algae which they attributed to low water. After consulting two biologists and the NYS Department of Environmental Conservation, the algae problem was considered to be more a question of stagnation than water level.

From 1964 to 1976, the weir was operated to maintain a water level of 819.00 f.a.s.l. and while pacifying the residents in low water areas, it created problems in other respects. This higher level is only 12 inches from flood stage for our lowest residents (820.00 f.a.s.l.) and the records show that the lake can rise that one foot in less than 24 hours. It also caused many lawns to be spongy and damp most of the year, creating breeding grounds for mosquitoes, loss of use of residents yards for recreation, the shifting of house foundations and shoreline erosion when winds reached 20-30 mph in either a north or south direction. This erosion has cost a great deal of money in lawn and tree replacement.

This year we are attempting to maintain a level of 818.50 f.a.s.l. and, to this date, we have received the least number of complaints. We have even had some compliments. The problem now is that without

a reliable water source to replenish the lake for the summer, it is uncertain how long we can maintain 818.50.

As for conclusions, it would appear that a decision should be made in the range of 818.00 to 818.50 f.a.s.l. The problem areas of low water are only going to worsen in the future due to sediment build-up in the north end and south sides of the various points and we don't believe there is any answer for these areas short of endangering other properties by an artificially high water level. We also feel that in order to maintain the best conditions (818.50 at present) it is necessary to ensure a water source for replenishment during July and August. Perhaps some sort of holding ponds in the swamp lands at the south end of the lake would be an answer.

We hope this information is of value to you and if we can be of any further help, please feel free to contact us.

Yours very truly,

Kay Conlon, Chairman
Water Level Committee
Conesus Lake Association

KC:jm
cc DAuble, President
RErskine, Exec. Secy.

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION
William C. Hennessy, Commissioner

1220 Washington Avenue, State Campus, Albany, New York 12232

June 5, 1980

Mr. Donald M. Liddell
Chief, Engineering Division
U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, New York 14207

Dear Sir:

RE: NCBED-DF

In accordance with your request of May 12, 1980, and the telephone conversation with your staff we are sending the information we have available at the Conesus Lake Inlet.

This consists of the following:

1) Logs of auger and drill holes
2) Base maps for location of explorations
3) Soil Map of area from Livingston County Soil Survey
4) Soil descriptions of map units from Livingston County Soil Survey.

We trust the attached information will be of assistance to you.

Very truly yours,

Lyndon H. Moore, Director
Soil Mechanics Bureau

By: Edward Fernau P.E.

Edward A. Fernau
Senior Soils Engineer

EAF:sd
Attachments

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PN

21 May 1980

Mr. Edward Holmes
New York State Department of
Environmental Conservation
Region 8
6274 East Avon-Lima Road
Avon, NY 14414

Dear Mr. Holmes:

We have reviewed the concerns discussed in Mr. Cooper's letter of 8 April 1977 and your 8 July 1977 memo regarding our Reconnaissance Report on Conesus Lake.

We have made two engineering assessments of the flooding of the marsh south of Sliker Hill Road and are convinced that the culvert under Sliker Hill Road controls the flooding of the marsh. We recognize that flood stage on the lake will spill over into the marsh; however, where the lake is below flood stage, the culvert controls flooding in the marsh. Guided by Dr. White's report and our recent Corps engineering studies, we see no need for additional study of furbearers or waterfoul in the south marsh area. We agree with Dr. White's statement that "No regulation of Conesus Lake will effect this area so long as the adult spawning pike have access to the marsh through Conesus Inlet Creek. If this creek were blocked, by dykes or other structures, the population would be unable to reach the marsh and the pike population of Conesus would probably suffer considerably." Our present lake management plans will not significantly affect this inlet. It is important to remember that the lake management plan calls for raising the lake level in the spring to about elevation 819; so if you have any further data relative to fish and wildlife existing conditions or management which we have not seen, we would be interested in receiving and reviewing it.

We look forward to meeting with you on 23 May 1980 at your office in Avon. As discussed, Dr. White will attend that meeting to answer any additional questions you may have.

Sincerely,

Daniel T. Kelly

DANIEL T. KELLY
Chief, Eastern Basin

NCBED-PN

SA/22/4

2 April 1980

Honorable Barber B. Conable
House of Representatives
Washington, DC 20515

Dear Mr. Conable:

I am writing this letter to bring you up to date on the latest developments regarding the Conesus Lake Detailed Project Report (DPR).

I have recently approved a schedule change for this report. Provided we are able to obtain the necessary funding, we should complete the draft of the DPR by December 1980 with the final coordinated report transmitted to Office, Chief of Engineers (OCE) about June 1981.

One of the reasons for the change in the schedule was the incorporation of a Lake Management Study into the report. This study will assist us in determining our capability to better control the lake's levels. It will also be an integral part of the Environmental Impact Statement and a controlling factor in determining what improvements are required in the outlet.

I have attached a copy of a newsletter that will be distributed to everyone who has expressed an interest in the project.

If I can be of any further assistance, please do not hesitate to call.

Sincerely,

1 Incl
as stated

GEORGE P. JOHNSON
Colonel, Corps of Engineers
District Engineer

CF:
NDPA (DAEN-CWB-N)
[illegible]
Exec. Ofc.
[illegible]
NDPD-PN
NCBED-PN/Zernentsch

Honorable Barber B. Conable
Representative in Congress
311 Federal Building
100 State Street
Rochester, NY 14614

New York State Department of Environmental Conservation
6274 East Avon-Lima Road, Avon, New York 14414

Robert F. Flacke
Commissioner
Eric A. Seiffer
Regional Director

April 8, 1980

Mr. Charles Zernentsch
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Chuck:

We appreciated the opportunity to meet with you on 3/28/80 to discuss the Conesus Lake flood project. Discussions centered around the biological study and lake level regulation. As pointed out, we have worked closely with the Corps since the inception of the project. Early comments on the Recon report were submitted in September 1977 setting forth our concerns regarding fish and wildlife resources. Additional input was made during preparation of the Scope of Biological Study in March 1978 and comments on the completed scope forwarded to the Corps 3/31/78. During this entire period we have stressed the importance of Conesus Lake and Conesus marsh as a resource area. Our major concerns centered around the lake level/marsh water level relationships and what effect lake level management might have on these relationships. The purpose of this letter is to provide comments on the Biological Studies of Conesus Lake and Tributaries 1978-9, compare study with original scope and discuss future study needs with lake level regulation in mind.

Biological studies conducted on the outlet are acceptable. The fishery study on the lake is also acceptable with one exception. The statement on page 53 indicated that for walleyes the lake level could be raised in early May. Since walleye begin spawning activity around April 1 this would not be unacceptable. The authors also make recommendations as to lake level requirement for individual species. However, warm water spawning activity occurs from approximately March 1 through June 15. Therefore, lake levels must be maintained throughout this period. The waterfowl surveys on the lake failed to indicate much

utilization by diving ducks. Our experience shows that the lake receives considerable use by canvasbacks, redheads and scaup during spring and fall migrations.

The major problem with the report is the study efforts conducted at the south end of the lake. As pointed out in the scope of work and comments on the Recon report, our main concern was lake level/marsh level relationships and fish and wildlife dependencies on water levels. The authors concluded that there was no relationship, that the levels of the lake had no effect on the marsh. Because of this they did not conduct any surveys south of Sliker Hill Road. This is the location of the Conesus Inlet Fish and Wildlife Management area. We feel that by eliminating this area from study the entire purpose of the study failed. The objective of the scope of work was to provide data and recommendations for lake levels needed to maintain the ecosystem of Conesus Lake and provide data and information to allow assessment of lake level management impacts. Without information of northern pike spawning within the marsh we have no way of judging where the major percentage of production occur, in the W.M.A. or the wetmeadow north of Sliker Hill Road. Also a complete waterfowl and furbearer study is needed as described in paragraph 10 and 11 of the scope of study. In order to make proper management decisions we must know what lake levels/marsh water levels are needed to sustain the marsh ecosystem as is, to provide increased production and optimum production.

Therefore we feel that a hydrological study is needed to indicate the relationship between Conesus lake levels and water levels in the W.M.A. marsh. Is there a direct back water effect during spring runoff and during summer flows? Is the major effect the status of the ground water table? If ground water plays a major role in marsh water levels is there a relationship between lake levels and ground water levels? Is there a lag time between high lake levels and corresponding marsh water levels and visa versa. If a correlation can be drawn concerning these matters then an evaluation of lake level regulation can be made. But until such time as we have this information and the biological information for the W.M.A. marsh we cannot make a sound management decision.

We will continue to work closely with the Corps of Engineers on this project in order to fully protect the important fish and wildlife resource of the Conesus Lake Watershed and produce an environmentally sound project.

Sincerely yours,

Jack Cooper
Habitat Protection Biologist
Region 8

JC:bh
cc: Colonel Daniel D. Ludwig
James F. Kelley, Chief, Water Management Group

New York State Department of Environmental Conservatio
6274 East Avon - Lima Road, Avon, New York 1441-
Telephone: 716-226-2466

Robert F. Flacke
Commissioner

Eric A. Seiffer
Regional Director

April 30, 1980

Mr. Charles Zernentsch
Project Manager, Conesus Lake Study
U.S. Army Corps of Engineers
Buffalo District
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Zernentsch:

The minimum average 7 day, 10 year frequency flow, for which the Lakeville Sewage Treatment Plant was designed, is 10 c.f.s. If these conditions can be met, effluent limitations apply and secondary level of treatment is adequate.

If the flow is less than 10 c.f.s., tertiary level of treatment is required. This would require a substantial increase in cost to the District. The system is not flexible enough to provide different levels of treatment during different seasons.

I hope this is still useful for your purpose.

Sincerely,

Frank J. Keller

Frank J. Keller, P.E.
Senior Sanitary Engineer
Water Division

md

cc: Ned Holmes, NYSDEC
Jack Cooper, NYSDEC

Incl 6

CONESUS LAKE

March 31, 1980

Greetings: It has been about six months, since we met with you and discussed our proposed plans to lessen flooding on Conesus Lake. Much has happened since that meeting:

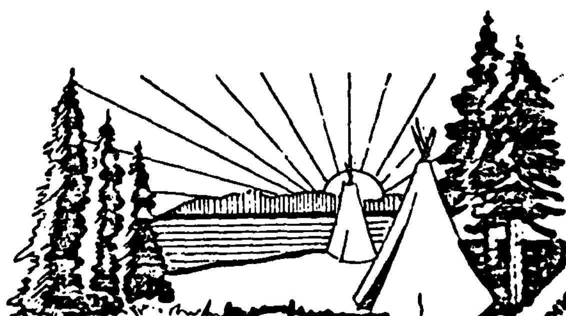
A new study manager, Mr. Charles Zernentsch, assumed control of the study in January.

The study schedule has been expanded to allow time to complete a Lake Management Study, an Environmental Impact Statement and the numerous other sections that make up a Detailed Study Report. The draft report is scheduled for completion in December with the Final report due in June 81.

The alternatives you saw in October haven't changed much, but we are developing a historical record of rainfall and lake levels for Conesus. We intend to use this data to access our ability to manage the lake's levels over a long period. While we can't completely control mother nature, we hope to temper the lake enough to benefit everyone concerned.

We would like to thank you for your tremendous response to our request for additional flood damages. The information you provided will be very valuable as the study proceeds.

We will be in touch periodically. If you have any questions, please address them to Mr. Zernentsch at the address below.



U.S. ARMY ENGINEER DISTRICT, BUFFALO
1776 NIAGARA STREET
BUFFALO, N.Y., 14207

Incl 1

United States Department of the Interior
HERITAGE CONSERVATION AND RECREATION SERVICE
INTERAGENCY ARCHEOLOGICAL SERVICES-ATLANTA
Richard B. Russell Federal Building
75 Spring Street S.W.
Atlanta, Georgia 30303

IN REPLY REFER TO:
W540
1201-02(a)

MAR 6 1980

Mr. Donald M. Liddell
Chief, Engineering Division
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Liddell:

Enclosed are one reviewer's comments concerning the report "Cultural Resource Predictive Model Literature and Records Search for Conesus Lake."

We appreciate the opportunity to review the report.

Sincerely,

Stephanie H. Rodeffer
Acting Chief

Enclosure

'ork State Department of Environmental Conservation
; Road, Albany, New York 12233

Robert F. Flacke,
Commissioner

February 25, 1980

Mr. Daniel T. Kelly, P.E.
Buffalo District
Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Kelly:

Frank Keller recently asked that file reports dealing with Conesus Lake be forwarded to you for use in your current study. Enclosed is a report done in the early 1970's by DEC staff on regulation studies of the Lake.

Sincerely,

Allan C. Tedrow
Associate Hydraulic Engineer

ACT:lb

cc: F. Keller - w/enc.
E. Karath

New York State Department of Environmental Conservation
5274 East Avon - Lima Road, Avon, New York 14414
Telephone: 716-226-2466

Robert F. Flacke
Commissioner

Eric A. Seiffer
Regional Director

February 19, 1980

Daniel T. Kelly, P.E.
Buffalo District
Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Kelly:

Re: Conesus Lake Study

I have received your letter dated February 11, 1980. I have an interest in your Lake Management Study for Conesus Lake because of my work in the Statewide Water Quality Management Study and my prior work in Water Resources Planning Studies.

Conesus Lake is discussed in both studies.

I do not have a copy of the work done by the DEC in the Genesee River Basin Water Resources Study. When in Albany, Friday, February 15, 1980, I discussed this subject with Al Tedrow and Ed Karath. I recall there was some work done of Lake levels on a frequency analyses of controlled outflows with various quantities of discharge. Because the work was done before 1974, I wasn't as familiar with it as I might have been.

If there was some work done, as I think, and copies of it can be located, they will be sent to you.

Please keep me informed about this study.

Sincerely,

Frank J. Keller/md

Frank J. Keller, P.E.
Senior Sanitary Engineer
Water Division

md

cc: Al Buddle
Ed Karath w/attachment
Al Tedrow w/attachment

UNITED STATES GOVERNMENT

memorandum

DATE: FEB 14 1986

REPLY TO ATTN OF: Archeologist, Interagency Archeological Services-Atlanta

SUBJECT: Report Review of "Cultural Resource Predictive Model Literature and Records Search for Conesus Lake, New York."

TO: Archeologist, IAS-A

I have read the above report, which presents a literature search, formulates a predictive model, and provides recommendations for future cultural resource management of the Conesus Lake project area. My comments are as follows.

Chapter V references Hammer's 1979 regional site prediction model, and proceeds to make recommendations based on a more detailed version of this model. A thorough explanation of Hammer's criteria should be presented at the beginning of this section.

All plates (1 through 7) referenced in the text are missing from the report.

A legend should be included with Figure 15 (as in Figure 17) which explicitly shows which symbols represent which areas. It is difficult to tell exactly which sections constitute zones MR 1, 2, 3, 4, and 5.

Chapter VII presents recommendations in the form of a summary, and this will be valuable to the Corps in making management decisions. It would be helpful to the reader to include a section preceding this which lists each Micro Region and the reasons why no further testing is recommended. For example, on page 59, #3, why is the Fish and Wildlife Area in Zone 6 not recommended? Figure 17 does not show it to be disturbed. Is this an area of poor drainage or high slope? Rather than flipping through the report for the various charts and tables, it would be easier to have the information spelled out in one place.

Regina Pitaro

Regina Pitaro

jeg/2274

NCBED-PN

11 February 1980

New York State Department of
Environmental Conservation
ATTN: Mr. Frank Keller
Region 8
P.O. Box 57
Avon, NY 14414

Dear Mr. Keller:

We were given your name by Mr. Allan Buddle of your Elmira Field office as the person to contact regarding the detailed project report we are preparing for Conesus Lake. As part of this report, we are doing a lake management study. For this study we need to identify the following information: required monthly target elevation for the lake; desired monthly elevation; minimum discharge from the lake (e.g. for waste assimilation, etc.); desired discharge from the lake. We realize that there are varied interests to be considered on Conesus Lake. However, with this lake management study we hope to demonstrate that the environmental, recreational and flood control interests can be adequately managed.

If you have any questions regarding this study, please feel free to contact Mr. Charles Zernentsch, study manager, at (716) 876-5454, ext. 2244.

Sincerely,

DANIEL T. KELLY, PE
Chief, Eastern Basin

CF:
NCBED-PN (Zernentsch)
NCBED-PE (Bryniarski)

Conesus Lake Association Inc.

P.O. BOX 79, LIVONIA, N.Y. 14487

January 10, 1980

Mr. Anthony Eelman
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Tony:

Enclosed are scores of letters from residents outlining heretofore unreported flood damage since 1972.

Many letters did not include estimates of damage. People find it difficult to pin a price tag on the loss of 10 or 15 feet of beach across a 50 foot lot. Many letters indicate many severe hardships caused by flooding. One letter shows 6 weeks of work lost directly due to illness caused by the flood. No salary was given.

Only one response was questionable. One resident, in addition to legitimate damage, listed $100,000 as the value of his life which was threatened. Obviously, we didn't include that in the totals.

I have attached a resume of the damages. An asterisk indicates damage but no cost estimated. Two asterisks indicate much damage and no cost estimate. In letters which listed a specific number of hours of labor, we used a conservative figure of $5 per hour.

Many people included pictures and graphic descriptions of the torment and problems caused by repeated flooding.

The residents report damages exceeding $327,000. Add to this the $48,600 in well documented losses by the County Sewer Agency, $25,000 by Camp Stella Maris, $6,000 by our Association and $100,000 by the State of New York for the dredging operation.

We have not included estimates of the money spent by the Sheriff's Department, Red Cross and other government agencies which spent much time at the lake during flooding. Add to this the time and money spent by the Association and the town governments of Livonia, Geneseo, Conesus and Groveland since 1972 and before.

The amount of loss reported in the attached letters is approximately $506,000.00. This, together with previously reported damage, brings the total amount reported to about $1 million.

It is obvious that there had to be much more in damages that has not been reported by residents who have sold their homes and moved

since the flooding. The question of cost effectiveness seems no longer to be a problem.

I would appreciate the return of these letters together with those now in your possession from previous reports.

If you have any questions, please let me know.

Sincerely,

Donald H. Auble

DHA:jfm
B Conable

Donald H. Auble, President
Conesus Lake Association

Flood Damage Report 12/79

* indicates damage but no cost estimate
** indicates considerable damage with no cost estimate

Rombout	$ 1,817.72	Mahaney	$23,254.16
Camp Stella Maris	25,000.00	Kusak	6,120.69
Sewer Agency	43,632.58	Neuriter	365.00
State of NY	100.000.00	Roe	23,541.00
Moore	13,100.00	Meekin	1,416.00
Herr	22,500.00	Neff	200.00
Frocchi	300.00	Dodge *	
McCarthy	4,500.00	Holmes *	
Pope	270.00	Darg **	10,000.00
McG[illegible] *		Mulcahy	4,400.00
Bowen **	221.00	Patton *	
Cash	2,000.00	Werner *	
Simpson	3,295.00	Wolicki	3,375.00
Schwartz	690.00	Carey	8,200.00
Burke, Rev. **	10,000.00	Cragmile	100.00
Schwalbach, Dr. **	11,000.00	Gottery *	
Heller	2,500.00	Cummings	487.00
[illegible]	3,500.00	Cooney	2,047.00
[illegible]	5,500.00	Brindisi	12,250.00
Askins *		Percival	630.00
[illegible]	3,520.00	NYS	100,000.00
[illegible]ford	1,430.00	Yanno	1,439.02
[illegible] **	1,500.00	Hassett *	5,265.00
F. [illegible]	1,025.00	Blum **	250.00
Teall *		Francis	2,204.00
Hol[illegible] *		Wilson	3,560.00
Salzer **		Hayes ** and 6 wks. work	
Ellison	2,300.00	German	1,730.00
[illegible]ndrick *	175.00	Stokes **	1,013.97
Ad[illegible]		Smith **	1,510.00
S[illegible]		Davis	345.00
[illegible] *		Richardson **	
Hollenbeck **		Fraser **	450.00
Sedor	2,000.00	Suter	1,600.00

Kress **	$17,200.00
3352 E. Lake Rd.	6,000.00
Truelson **	
Sandrock	799.50
Whitman	1,040.00
R. Notebaert	16,300.00
J. Notebaert	3,385.00
Schultz	2,000.00
Holowka **	100.00
Bowe	750.00
True *	
Holderle	8,250.00
Blum **	
Barber	1,175.00
Green	5,840.00
Shannon **	
Yahn	295.00
Minster **	8,000.00
Babcock	1,930.00
David	52.00
Brewer	366.18
Kronquest	5,100.00
Moore	925.00
Ruppel	5,485.00
Long	1,236.00
Hill	13,500.00
Beach **	5,000.00
Smith	900.00
Lea **	4,100.00
Keyser **	345.00
Hudak ***!	
Coakley **	
Page	914.60
Sibley	3,200.00
Joswick	4,267.00

TOTAL: $506,489.20, plus *, **, and ***

You Are Invited To A

WORKSHOP

~~PUBLIC~~ MEETING ON CONESUS LAKE

WHEN 7:30 PM – THURSDAY, 25 OCTOBER 1979

WHERE: LIVONIA CENTRAL SCHOOL AUDITORIUM,
School Rd., Livonia, N.Y.

WHY: To present preliminary alternative plans to prevent further flood damages to Conesus Lake properties and invite the public to voice their views. Representatives of the Corps Buffalo District will conduct the meeting. Ample opportunity will be provided for citizens, officials, and representatives of agencies to ask questions and make comments.

FOR ADDITIONAL INFORMATION CONTACT:
U.S. ARMY CORPS OF ENGINEERS, BUFFALO DISTRICT
1776 Niagara Street, Buffalo, N.Y. 14207
(716) 876-5454 Extension 2244

9

NEW YORK STATE PARKS & RECREATION Agency Building 1 Empire State Plaza Albany New York 12238 Information 518 474-0456
Orin Lehman Commissioner

December 20, 1979

Mr. Donald M. Liddell
Chief, Engineering Division
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, N.Y. 14207

Dear Mr. Liddell:

Conesus Lake, Livingston County
Cultural Resource Report
"Cultural Resource Predictive Model Literature and Records Search for Conesus Lake, N.Y."

The State Historic Preservation Officer (SHPO) has reviewed the above-referenced report. The report represents a professional effort and the conclusions seem well justified, with one exception. The request for monitoring is somewhat unusual and your archeologist may wish to discuss the situation with Bruce Fullem, our senior staff archeologist. Overall, the report seems to make good use of the concept of models and hopefully this will represent a savings to you.

If you have any questions on this matter, please contact Mr. Fullem of the project review staff at 518-474-3176.

Sincerely,

STATE HISTORIC PRESERVATION OFFICER

By Stephen J. Raiche, Director
Historic Preservation Field Services

BF:mr

Conesus Lake Association Inc.
P.O. BOX 79, LIVONIA, N.Y. 14487

December 5, 1979

Mr. Anthony Eelman
U. S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Tony:

The following is a list of flood damages which were suffered by this Association since the flooding began in 1972.

1. Remove tree from creek bank at weir to create bypass — $500
2. Long distance phone calls to area radio and TV stations and newspapers regarding flood alerts — 25
3. Legal fees paid to our attorney to assist in formation and operation of Compact — 1500
4. Surveyors fees paid by Association and donated to Compact — 250
5. Legal fees paid to attorney for conferences with Senator Volker, Assemblyman Emery, Congressman Conable, Governor Carey to arrange $100,000 in State Budget for dredging project — 1000
6. 150 hours for Conlon, Meekin and Cunningham to prepare and "Catastrophe of Conesus" — 750
   Cost of slides and mileage costs — 130
7. Cost of Hot Line telephone for flood info (2 years) — 550
   Installation and removal — 100
8. Volunteers who "baby sat" Hot Line for 12 hrs/day for approximately 20 days @ $5/hr. — 1200
9. Other untold hundreds of hours spent by 30 directors during flooding time and also for the last 7 years in lobbying and fighting to get the Corps to the present status on our Flood Control Project. It has been the Association's number 1 project for years.

Total cost outlay is above $6005.

Yours truly,

Donald H. Auble, President

DHA:jfm

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

NCBED-PN

6 July 1978

The purpose of this letter is to inform you that I have initiated studies on a Detailed Project Report (DPR) at Conesus Lake, NY, for flood control authorized under Section 205, Flood Control Act of 1948, as amended, and to invite your expression of interest in the project.

Conesus Lake residences have experienced numerous floods in the past. The worst flood on record was tropical storm "Agnes" in June 1972 when the flood stage peaked at elevation 822.6 feet, causing extensive damage to structures and docks. The prime cause of flooding is the inadequacy of the outlet at Conesus Creek to discharge the high quantities of water in Conesus Lake produced by excessive rainfall and/or snowmelt conditions. Our investigations will determine the best solution or solutions to alleviate the flooding conditions at Conesus Lake.

Currently, I am conducting damage surveys at Conesus Lake to determine what damages occur at specific flood stages. These surveys should be completed by 1 August 1978. Also, environmental studies will begin around 15 July 1978 and continue through the spring of 1979. If a project is found to be economically feasible, environmentally sound, and socially acceptable, and we have no funding delays or any other unforseen problems, construction could begin in the fall of 1981. A tentative schedule for future actions is as follows:

Public Meeting	March 1979
Draft DPR	November 1979
Final DPR	April 1980
Plans & Specifications	March 1981
Begin Construction	September 1981

NCBED-PN

All interested parties have the opportunity to express their views regarding the study. We are inviting your expressions of interest in this study including any pertinent information or specific comments you may wish to offer.

Initial activities for this project will include informal meetings with interested parties as the needs become evident. Your views at this time would significantly add to the productivity of these meetings.

Thank you for your interest in this regard.

Sincerely yours,

Daniel D. Ludwig

DANIEL D. LUDWIG, PE
Colonel, Corps of Engineers
District Engineer

NCBED-PN 24 March 1978

Honorable Barber B. Conable, Jr.
House of Representatives
Washington, DC 20515

Dear Mr. Conable:

Thank you for your letter of 16 March 1978, requesting a more accelerated work plan for Conesus Lake.

I understand your concern with the schedule I gave to you in my 3 March 1978 letter, but the potential environmental problems and the coordination with several political entities have a greater effect on time schedules than the size of the project itself. However, it is fortunate, with your assistance, I was able to obtain funds to begin the environmental studies this fiscal year.

The environmental study objectives are to provide data and conclusions concerning the elevation, frequency, and duration of lake levels required to maintain or enhance the existing ecosystem of Conesus Lake, and to provide data and information that will allow assessment of the impacts of structural plans that might be considered in various lake level regulating plans. The environmental field studies on the lake will be conducted during the summer and fall of 1978, and in the spring of 1979 to obtain seasonal ecosystem information. The draft Environmental Impact Statement could be completed in the fall of 1979. During that time, I will also evaluate alternative structural plans that could provide more control of the lake water levels. I cannot accelerate this procedure, but perhaps I can hasten other facets of the project.

I am making arrangements to meet with representatives of the New York State Department of Environmental Conservation (DEC) in mid-April at Conesus Lake to discuss the project at the site and determine to what extent DEC can assist in our environmental studies. By placing a high priority on this most important project and discussing my concern with DEC, I expect to be able to shorten the total schedule to effect an earlier construction date.

NCBED-PH mf/2245
Honorable Barber B. Conable, Jr.

Your concern is most gratifying. Please contact me if you have any further questions.

Sincerely yours,

DANIEL D. LUDWIG
Colonel, Corps of Engineers
District Engineer

CF:
HQDA (DAEN-CWA-D) w/incmg corres.
NCDED " "
Exec. Ofc. " "
PAO " "
NCBED-PH " "

Honorable Barber B. Conable, Jr.
Representative in Congress
311 Federal Building
Rochester, NY 14614

BARBER B. CONABLE, JR.
NEW YORK, 35TH DISTRICT

COMMITTEES
WAYS AND MEANS
BUDGET
JOINT COMMITTEE ON INTERNAL REVENUE TAXATION

Congress of the United States
House of Representatives
Washington, D.C. 20515

WASHINGTON OFFICE:
2228 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-3615

DISTRICT OFFICE:
311 FEDERAL OFFICE BUILDING
100 STATE STREET
ROCHESTER, NEW YORK 14614
(716) 263-3156

March 16, 1978

Col. Daniel D. Ludwig
Buffalo District Engineer
Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Ludwig:

I am writing in response to your letter about the status and projected schedule for the flood protection project at Conesus Lake.

I am pleased to have confirmed your intention to commence work shortly on the necessary environmental studies, but I am disappointed that completion of construction is not anticipated to be reached until the summer of 1983. That is five and a half years distant, a very long time for people to endure such serious flood conditions as occur regularly in the Conesus Lake area.

Because the conditions there are of an emergency nature, I wish to request your reassessment of the Corps' capability to move ahead more rapidly on this project so that the anticipated protection could be provided those residents at an earlier date. Perhaps the New York State Department of Environmental Conservation could cooperate with the Corps to carry out some of the project requirements simultaneously rather than in procession. I am concerned that a five and a half year time schedule is excessive for a project of this size and would prompt sharp reaction from the concerned people affected by the flood conditions. I hope it will be possible for you to develop a more accelerated work plan for this project.

Thank you for your cooperation and assistance.

Very truly yours,

Barber B. Conable

Barber B. Conable, Jr.

C/ns

New York State Department of Environmental Conservation
P.O. Box 57, Avon, New York 14414

Peter A. A. Berle,
Commissioner

Irwin H. King
Regional Director

March 14, 1978

Mr. Philip E. Berkeley
Environmental Resources Unit
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Mr. Berkeley:

Please find enclosed a set of 1' contour maps for the Conesus Inlet Fish and Wildlife Management Area at the south end of Conesus Lake per our March 13, 1978 discussion at this office. If the quality is not sufficient, I can contact Albany to try to obtain copies from the original milars.

Let us know if we may be of any further assistance.

Very truly yours,

John R. Hauber

John R. Hauber
Sr. Wildlife Biologist
Region #8

JRH:er
enc.

mas/2175

NCBED-PR 6 March 1978

Mr. Paul Hamilton
Area Supervisor
Ecological Services
U.S. Fish and Wildlife Service
100 Grange Place
Cortland, NY 13045

Dear Mr. Hamilton:

The Buffalo District is currently initiating a Section 205 Flood Control Study of Conesus Lake, Livingston County, NY. Flooding problems have been quite serious on Conesus Lake during the past several years and there is considerable local interest in the Corps providing a solution to flooding on the lake.

From our contacts with the New York State Department of Environmental Conservation and from review of recent publications on the lake we understand that there is a valuable fishery in the lake. There are many other environmental concerns that would be raised during any studies of flooding problems on Conesus Lake.

A meeting is planned on 13 March 1978 at 10:00 a.m. with representatives of NYSDEC in their Avon, NY headquarters. The primary purpose of this meeting is to discuss existing environmental concerns about the Lake and to attempt to conclude what environmental studies may be necessary during the Corps Section 205 flood control study of Conesus Lake.

We would appreciate having a member of your staff present at the Avon meeting. Contact Mr. Philip Berkeley of our Environmental Resources Staff if you have any questions.

Sincerely yours,

JAMES M. BENNETT
Fish and Wildlife Coordinator

Berkeley____

CF:
NCBED-PR

Bennett____

NCBED-PN

sw/2245
3 March 1978

Honorable Barber B. Conable, Jr.
House of Representatives
Washington, DC 20515

Dear Mr. Conable:

Thank you for your letter of 21 February 1978 concerning the status of the Conesus Lake Flood Protection Project and the anticipated schedule for carrying this project through to construction.

The Detailed Project Report will be performed in two steps. First, detailed environmental studies will be accomplished which would aid in resolving the Fish and Wildlife resource issues raised by the New York State Department of Environmental Conservation. In the second step, the necessary engineering, economic, and environmental studies to complete the Detailed Project Report activities would be performed.

Since we have received approval of funds to begin the environmental studies, this work will commence shortly and completion of the Detailed Project Report is expected in the fall of 1980. With continued funding, project construction could be completed by summer of 1983. Enclosed is a line diagram showing this schedule. The construction schedule does have an 18-month constraint to permit NYSDEC to obtain the necessary real estate to construct the project.

I trust this information meets your present needs. Please contact me if you have any further questions.

Sincerely yours,

DANIEL D. LUDWIG, PE
Colonel, Corps of Engineers
District Engineer

1 Incl
as stated
CF:
HQDA (DAEN-CWA-D) w/incmg. corresp.
NCDED "
Exec. Ofc. "
PAO "
NCBED-PN "
Honorable Barber Conable, Jr.
Representative in Congress
311 Federal Building
Rochester, NY 14614

[illegible] CONABLE, JR.
[illegible] York, 35th District

COMMITTEES:
WAYS AND MEANS
BUDGET
JOINT COMMITTEE ON
INTERNAL REVENUE TAXATION

Congress of the United States
House of Representatives
Washington, D.C. 20515

WASHINGTON OFFICE:
2228 Rayburn House Office Building
Washington, D.C. 20515
(202) 225-3615

DISTRICT OFFICE:
311 Federal Office Building
100 State Street
Rochester, New York 14614
(716) 263-3156

February 21, 1978

Colonel Daniel D. Ludwig
District Engineer
Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Ludwig:

I am pleased to learn that you have received approval of funds by the Division Engineer for the environmental studies required in connection with the flood protection improvement project at Conesus Lake. I understand the New York State Department of Environmental Conservation has raised numerous questions in connection with an improvement project at the lake and these must be resolved.

You and your staff were helpful last year to local officials and residents of the Conesus Lake area by providing technical advice on measures to be taken to provide some temporary relief from flooding at the lake. Unfortunately, the parties have been unable to raise sufficient funds to carry out this work to date.

The area residents understand the need for temporary protection measures during the period in which a comprehensive project is being planned by the Corps of Engineers, and would still like to do what they can. I met recently with representatives of the lake residents to discuss the local conditions and a course of action for reducing the immediate dangers of flooding. Their planning for these emergency measures would be greatly aided, they said, by a clear understanding of the timetable for the Army Corps of Engineers' effort.

As a result, I agreed to request from you a report on the anticipated schedule of action by your office for carrying through this project to construction. We realize that such a projection at this time is only that, and not a firm commitment, but we all hope this project can be moved ahead with dispatch because of the heavy damages which have occurred there in recent years. The anticipated schedule for the Engineers' work would be helpful in the planning of local efforts and would be appreciated by all parties.

Thank you for your assistance on this.

Very truly yours,

Barber Conable

BARBER B. CONABLE, JR.
NEW YORK, 35TH DISTRICT

COMMITTEES:
WAYS AND MEANS
BUDGET
JOINT COMMITTEE ON
INTERNAL REVENUE TAXATION

Congress of the United States
House of Representatives
Washington, D.C. 20515

WASHINGTON OFFICE:
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DISTRICT OFFICE:
311 FEDERAL OFFICE BUILDING
100 STATE STREET
ROCHESTER, NEW YORK 14614
(716) 263-3156

January 5, 1978

Col. Daniel D. Ludwig
District Engineer
Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Ludwig:

Thank you for your letter concerning the status of the Section 205 study on flooding at Conesus Lake.

You reported that you are requesting funds to prepare an environmental report on the proposed project in response to the extensive environmental comments made by the State Department of Environmental Conservation. I will be glad to urge approval of your request if you deem it necessary. In addition, I am writing to the State Commissioner of Environmental Conservation requesting the full cooperation of his agency in developing a desirable project for flood protection at the lake.

I will appreciate being advised of any further significant developments concerning the project at Conesus Lake.

Very truly yours,

Barber Conable

Barber B. Conable, Jr.

C/ns

FILE COPY
Checked by
Filed by

DETAILED PROJECT REPORT
CONESUS LAKE, NEW YORK

APPENDIX G

COMMENT/RESPONSE

LETTERS

U.S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207

APPENDIX G

COMMENT RESPONSE ON THE DRAFT DETAILED PROJECT REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

AUG 14 1981

Col. George P. Johnson
District Engineer
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Dear Col. Johnson:

I am replying to your request of July 21, 1981, to the Federal Energy Regulatory Commission for comments on the Draft Environmental Impact Statement for Conesus Lake, New York. This draft EIS has been reviewed by appropriate FERC staff components upon whose evaluation this response is based.

1 This staff concentrates its review of other agencies' environmental impact statements basically on those areas of the electric power, natural gas, and oil pipeline industries for which the Commission has jusrisdiction by law, or where staff has special expertise in evaluating environmental impacts involved with the proposed action. It does not appear that there would be any significant impacts in these areas of concern nor serious conflicts with this agency's responsibilities should this action be undertaken.

Thank you for the opportunity to review this statement.

Sincerely,

Jack M. Heinemann
Advisor on Environmental Quality

FEDERAL ENERGY REGULATORY COMMISSION (14 August 1981)

1. Thank you for your review and comment. No response necessary.

United States Department of Agriculture
Soil Conservation Service
U. S. Courthouse and Federal Bldg.
100 South Clinton Street, Room 771
Syracuse, New York 13260

August 31, 1981

Colonel George P. Johnson
Buffalo District, Corps of Engineers
Commander and District Engineer
1776 Niagara Street
Buffalo, New York 14207

Dear Colonel Johnson:

We have reviewed the "State III Detailed Project Report and Environmental Impact Statement, Conesus Lake, New York," dated July 1981.

1 On page E-2, there is a discussion of discharge sites for the dredged or fill material. Care should be taken in the discharge of this material so as not to obstruct or impede the functioning of existing farm drainage systems. Otherwise, we have no further comments on this submission.

We appreciate the opportunity to review and comment on this proposal.

Sincerely,

Paul A. Dodd
State Conservationist

cc: Norman A. Berg, Chief, Soil Conservation Service, Washington, D.C.
Arthur Holland, Director, NETSC, SCS, Broomall, Pa.
Office of Federal Activities, EPA, New York, New York
Warren L. Wittmann, AC, SCS, Batavia, New York
James A. Booth, DC, SCS, Leicester, New York

SCS AS 1
10-79

U. S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE (31 August 1981)

1. Thank you for your review and comments. With respect to impediments which might hinder expedient drainage of surface waters via natural or artificial systems on agricultural lands which interface the project zone—concerns often pertain to variations in discharge and water levels. Hydrological and hydraulic investigations show, however, that for this project (particularly relative to project scale) these effects would not be significant. Consideration is given so that no impediment would be created which would result in the disservice of existing subsurface drainage lines. Any depositing of soil from the bank modifications and dredgings on agricultural lands would be done in such a manner as to retain natural or existing drainage characteristics, and in a manner as agreed upon/indicated by the respective land owners/operators. This would be determined in negotiations for land and easements, and would be developed in more detail in finalization of plans and specifications. Disturbed banks would be promptly fertilized, seeded, and mulched to reduce potential erosion.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (dpl)
Ninth Coast Guard District
1240 East 9th St.
Cleveland, Ohio 44199
(216) 522-4435

16475
SEP 14 1981

Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara St.
Buffalo, New York 14207

re: Stage III Detailed Project Report and
Draft Environmental Impact Statement
Conesus Lake, New York, July, 1981

Dear Sir:

1 The Ninth Coast Guard District has reviewed the referenced Statement and has no comment or ojections to offer at this time.

Sincerely,

K. D. PETERSON
Commander, U. S. Coast Guard
District Planning Officer
By direction of the Commander,
Ninth Coast Guard District

Copy to: COMDT(G-WS-1/12)

DEPARTMENT OF TRANSPORTATION - UNITED STATES COAST GUARD (14 September 1981)

1. Thank you for your review. No further response necessary.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Project Review
15 State Street
Boston, Massachusetts 02109

ER-81/1471

September 18, 1981

Colonel George P. Johnson
District Engineer, Buffalo District
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

1 Dear Colonel Johnson:

The Department of the Interior has reviewed the Stage III Draft Detailed Project Report and the Draft Environmental Impact Statement for Conesus Lake, New York. The following comments are for your consideration in preparation of the final report and environmental impact statement.

GENERAL COMMENTS

2 In general, the draft detailed project report and draft environmental impact statement provide an adequate description of existing fish and wildlife resources and of potential project-related impacts on those resources. It does not, however, discuss measures that should be taken to mitigate or compensate for anticipated adverse impacts on the lake's fish resources, nor does it discuss features that could be included to enhance public use of the lake's fish and wildlife resources.

3 Mineral resources, as such, are not discussed in the report. Minerals were not included as one of the considerations in the selection of a viable alternative process as presented on page 20, Planning Objectives, pagragraph a.(2), nor are they listed with the Evaluation Criteria in Table 4, page EIS-25. Appendix C presents the results of a construction materials survey designed to determine possible material sources for the construction of the project. Although this section appears adequate and fulfills the purpose for which it was designed, it should not be considered a mineral resource appraisal of the area.

For completeness, the report should describe mineral resources in the project area, complete with a discussion of the project's effects on their development. If the impact on in-the-ground mineral resources is considered minimal, the final statement should contain a statement to that regard.

UNITED STATES DEPARTMENT OF THE INTERIOR - OFFICE OF THE SECRETARY
(18 September 1981)

1. Thank you for your review and comments.

2. Measures that will be taken to mitigate or compensate for anticipated impacts on the lake's fish resources, and features that could be included to enhance public use of the lake's fish and wildlife resources have been further coordinated and incorporated into the final reports. See EIS pages EIS-5, EIS-45, EIS-48, EIS-63, and pertinent sections of Appendices E and F.

3. Impacts to mineral resources have been referenced in the Final EIS. See page EIS-27 and pertinent sections in Appendix C. The impacts to mineral resources is considered minimal.

CONTINUED NEXT PAGE

DETAILED COMMENTS

4 DEIS, Page 5, Paragraph 2 - In reference to Mr. Holmes' letter of December 22, 1980, to Mr. Hamilton (draft detailed project report, Appendix A), the Division of Fish and Wildlife of the New York State Department of Environmental Conservation (NYSDEC), Avon, New York, has completed a detailed plan for the scalping (grading) of wetlands at the south end of Conesus Lake to compensate for anticipated project-caused losses of northern pike spawning habitat. This plan is included in our final Fish and Wildlife Coordination Act report to be forwarded to the Corps of Engineers as part of formal interagency coordination. The proposed scalping plan should be referenced and/or described in the final statement where appropriate.

5 DEIS Page 39, Paragraph 3.28b - In reference to Mr. Holmes' letter of December 22, 1980, to Mr. Hamilton (draft detailed project report, Appendix A), the Division of the Fish and Wildlife of the NYSDEC, Avon, New York, has asked that public access to the waters of Conesus Lake for fish and wildlife related recreational purposes be included as an enhancement feature. Three alternative ice fisherman access plans have been developed by the NYSDEC and will be included in our final Fish and Wildlife Coordination Act report. The alternative plans should be referenced and/or described in the final statement where appropriate. A statement should also be made that all enhancement features will be cost-shared in accordance with provisions of U.S. Public Law 89-72 (Federal Water Project Recreation Act).

SUMMARY COMMENTS

6 If mitigation/compensation measures like those listed under Detailed Comments to create northern pike spawning habitat and fisherman access are included in the proposed project, no major impacts on fish and wildlife resources are anticipated based on available data.

Sincerely,

William Patterson

William Patterson
Regional Environmental Officer

UNITED STATES DEPARTMENT OF THE INTERIOR - OFFICE OF THE SECRETARY
(18 September 1981) CONTINUED

4. The proposed scalping measure is referenced in the Final DPR, EIS, and Appendices. See DPR page 34; EIS pages EIS-5, EIS-14, EIS-45, EIS-48, EIS-68, and pertinent sections of Appendices E and F.

5. The alternative access plans have been referenced in the final report. See EIS page EIS-63. The Corps of Engineers is aware of the problem of public access on Conesus Lake. The entire lakeshore, except for one State boat launch area and the southern marsh, is in private ownership. Therefore, the lake has little public recreational usage since access is limited. It is felt by this office that, although ice fisherman access is needed, the USFWS proposed plans are not practical for this area. The Corps of Engineers does not recommend implementation of the access plans as part of Conesus Lake project for the following reasons.

a. The additional cost for the ice fisherman access feature must be incrementally justified. Although public fishing access is not currently provided on Conesus Lake, ice fishing is prevalent. Fishermen presently park their cars either along East Lake and West Lake Roads or commercial parking areas of local taverns and restaurants located on the lake. Access to the lake also occurs through private properties, most of which are vacated throughout the winter. With the addition of an access area for ice fishermen, it cannot be demonstrated that this feature will create additional demand for ice fishing nor will it induce the existing fishermen to use the feature. Therefore, any minimal benefits associated with the F&W proposed feature will not likely offset the costs associated to it.

b. The area selected by USFWS as a point of access is a privately owned trailer park. The trailers in the trailer park during the winter months are primarily unoccupied. This could increase the potential for vandalism if public access were provided through the area.

c. The easements cited in the report along the proposed and existing channels are intended strictly for construction and maintenance access. Public access easements would be required. It is expected that the land owners would be reluctant to grant public access easements due to the potential for vandalism and property damage.

d. The proposed access plans would add costs to the project for several items that would need to be designed and evaluated such as a parking area (gravel, paved), foot path (mud, gravel, paved), handrails, restrooms, footbridge, and lands.

e. From a cursory review of the proposed parking areas, it is likely that acquisition of the lands will be difficult. Area A is located in the front yard and driveway of a large, permanent residence. Area B is a portion of an existing trailer park which would eliminate revenue for the owner from site rental. Area C does not conform to property lines and would require acquisition of portions of several properties.

f. It is suggested that NYSDEC, as the local cooperator, pursue this matter with local interests during the time that the terms of local cooperation for the flood management project are being obtained. They could be implemented independent of the project.

6. No further comment. Addressed in previous paragraphs.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

26 FEDERAL PLAZA

NEW YORK NEW YORK 10278

SEP 1 J 1981

Colonel George P. Johnson
District Engineer
Buffalo District
Corps of Engineers
1776 Niagara Street
Buffalo, New York 14207

Class: ER-2

Dear Colonel Johnson:

1 We have reviewed the draft environmental impact statement (EIS), the Stage III project report, and the section 404(b)(1) evaluation for Conesus Lake, Livingston County, New York. The proposed plan for flood damage reduction at Conesus Lake includes improvements to the lake outlet, construction of a new outlet control structure, and implementation of a lake level regulation plan which has been developed in conjunction with the New York State Department of Environmental Conservation (DEC) and the U.S. Fish and Wildlife Service (FWS). Improvements to the lake outlet will involve excavation of a new outlet channel, widening of the existing channel in Conesus Creek, and placement of rip-rap and other fill material in the Creek. The following comments regarding the project's potential impacts on wetlands and water quality are offered for consideration in finalizing the Consesus Lake flood control plan.

2 We have no objections to the proposed stream modifications whose potential environmental effects are adequately addressed in the EIS and 404(b)(1) evaluation. However, the effects of the proposed lake regulation plan, especially its effects on the two DEC controlled marshes adjacent to the Conesus Inlet Creek at the southern end of the lake, are inadequately explained. The lake regulation plan is designed to provide flood protection, adequate depth for recreational use, and enhancement of the northern pike fishery of the lake. Although the EIS states (p.28) that the DEC managed wetland south of Slicker Hill Road will not be "significantly" affected by the lake regulation plan, no supporting information is provided. The proposed winter draw down, which would lower the level of the lake by two feet, would seem to have the potential to significantly affect large areas of the wetlands. The report indicates that Conesus Lake has "lost most of its shoreline marshes to extensive development" (p.33). Any adverse effects on the remaining wetlands could thus be expected to have exaggerated deleterious effects not only on water quality, but on the fisheries which are proposed to be enhanced by the lake regulation plan. The impacts of the lake regulation plan on the remaining wetlands of the Conesus Lake watershed need to be more fully addressed in the final EIS. Furthermore, it is our understanding that an area of the remaining marshes may be proposed to be cut down to increase spawning habitat of the northern pike. The impacts of such a proposal, which sacrifices various functions of wetlands for a single purpose, must also be carefully evaluated.

<u>UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION II</u> (18 September 1981)

1. No response necessary.

2. The wetland south of Slicker Hill Road is affected principally by runoff from the South MacMillan Creek and Conesus Inlet watersheds. Peak rates of runoff in excess of channel capacity results in overbank flooding and subsequent recharge of the wetland. The average elevation of the wetland is approximately 820.5. If the wetland was affected by lake levels, this lake elevation would have to be exceeded every year to maintain the existing habitat. However, Figure A16 (Appendix A) indicates that there is only a 30 percent chance in any year that the wetland would be flooded directly by the lake, not 100 percent which would be needed to maintain habitat. In effect, the southern wetland area is only dependent upon stream flow and not the lake level.

In addition, the <u>Biological Studies of Conesus Lake and Tributaries</u>, 1978-1979, Livingstin County, NY, by White and Alldridge, concluded that water levels in this wetland - south of Slicker Hill Road - operated independently of Conesus Lake levels.

Revisions have been incorporated into the Final EIS, Final Detailed Project Report, and associated Appendices, which further identify (reference) wetland impacts and mitigation/enhancement measures. Reference EIS pages EIS-5, EIS-11, EIS-28, EIS-45, and pertinent sections in Appendix E.

The existing shoreline of Conesus Lake is heavily developed, thereby limiting the existing amount of open and undisturbed natural space - including wetlands along the lake. Since development is so intense, the few existing shoreline marshes are subject to continual disturbance by residents and recreationists, thereby reducing the quality of these marshes as valuable undisturbed habitat for fish and wildlife species.

The wetland known as the Ames parcel, located north of Slicker Hill Road, was carefully evaluated. Information obtained from USFWS, Cortland, NY, and NYSDEC, Avon, NY, and a 404 Evaluation performed by the Corps Buffalo District, were utilized to evaluate the ecological character of this wetland. Through coordination with the aforementioned agencies (reference Appendices E and F), it was agreed upon that to compensate for anticipated project-caused losses of northern pike spawning habitat and contributing productivity to Conesus Lake, 10 acres of State-owned wetland would be scalped, graded, and seeded. It was determined that these actions would not significantly affect other various functions of this wetland, but would mitigate for lost northern pike spawning habitat.

3 The lake regulation plan could also adversely affect water quality in Conesus Outlet Creek, and therefore in the wetlands located immediately upstream of the Route 256 Bridge, unless a minimum outflow of 10 cfs (which is required to dilute the effluent from the downstream sewage treatment plant) is maintained. Because there may be a conflict between this goal and the lake level requirements for recreational boating activities during summer months, the EIS should clarify that the first priority of the lake regulation plan during low-flow periods will be to maintain the required dilution flow.

4 I understand that in the period since the draft EIS was issued, the DEC, FWS and Corps of Engineers have continued their consultation process on the lake level plan, and that additional modifications proposed by these agencies may address the wetland issues raised in this letter. The final EIS should be amended to include this information. If possible, we would also like to review the most recent lake regulation plan prior to issuance of the final EIS so as to resolve our concerns during this interim period. Barbara Pastalove of my office should be contacted at FTS 264-2376 to coordinate this effort.

Based upon the above, and in accordance with Environmental Protection Agency policy, we have rated this EIS as ER-2, indicating that we have environmental reservations (ER) about the project's potential wetland impacts, and that more information (2) on the lake level plan is required to resolve these concerns.

5 Thank you in advance for your attention to our comments.

Sincerely,

Anne N. Miller

Anne Norton Miller, Director
Office of Federal Activities

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY - REGION II (18 September 1981)

CONTINUED

3. The implementation of the proposed Lake Level Regulation Plan and operation of the new control structure would still be subject to the minimum outflow of 10 cfs parameter as established by the existing New York State Department of Environmental Conservation (NYSDEC) permit. This has been incorporated in the development of the Lake Level Regulation Plan and Structural Alternatives. It will also be written into the Operations and Maintenance (O&M) Manual which will be provided when the project has been constructed. Reference the FDPR pages 12, 23; the FEIS pages EIS-6, EIS-14, EIS-15, EIS-20, EIS-22, EIS-39, EIS-43, EIS-62, EIS-64; and Appendix A sections A1.1.2 and A1.11. In addition, there are strong indications/recommendations (both State and Federal) that the County Sewer District, Lakeville, NY, be directly or indirectly involved in operating and/or monitoring the operation of the control structure for further assurance in meeting effluent assimilation needs.

4. In the period since the Draft EIS was issued, NYSDEC, FWS, and the Corps of Engineers have continued consultation on the lake level plan, and the additional modifications proposed by these agencies do address the wetland issues raised in your letter. The Final EIS addresses this information. See EIS and Appendices E and F.

A mitigation measure was developed by the NYSDEC, the USFWS, and the Corps for the wetland located north of Slicker Hill Road. This mitigation plan will require a Section 404(b) Evaluation which will be incorporated into the Final EIS. Your office has been provided a copy of the preliminary Section 404 transmitted by a public notice dated September 1981. This additional information should address your concerns. No significant modifications have been made to the Lake Level Management Plan since the draft report dated July 1981. If there are any future significant changes to the present lake regulation plan, we will promptly coordinate with your office.

5. Your review of the draft is appreciated. Information on the Section 404 Evaluation for the mitigation measure will be/have been mailed to the USEPA for review. To date, there are no significant changes in the Lake Level Management Plan, and targeted levels displayed in the Draft EIS, dated July 1981, have not changed.

STATE OF NEW YORK
EXECUTIVE CHAMBER
ALBANY 12224

ROBERT J MORGADO
SECRETARY TO THE GOVERNOR

August 5, 1981

Dear Colonel Johnson:

1 On behalf of Governor Carey, I acknowledge a copy of the Draft Detailed Project Report and Draft Environmental Impact Statement and Associated Appendices, entitled "Conesus Lake, New York" transmitted with your letter of July 21.

Sincerely,

Colonel George P. Johnson
Commander and District Engineer
District Corps of Engineers
Department of the Army
1776 Niagara Street
Buffalo, New York 14207

<u>STATE OF NEW YORK- EXECUTIVE CHAMBER</u> (5 August 1981)

1. Your receipt of the draft reports is acknowledged. No further response necessary.

THE SENATE
STATE OF NEW YORK

L. PAUL KEHOE
52ND DISTRICT
ROOM 515 LOB
ALBANY NY 12247
(518) 455-2031

COMMITTEES
AGRICULTURE
BANKS
COMMERCE & ECONOMIC DEVELOPMENT
ENERGY
GOVERNMENT OPERATIONS
HEALTH

August 12, 1981

George P. Johnson
Colonel, Corps of Engineers
Commander and District Engineer
Dept. of Army
1776 Niagara Street
Buffalo, N.Y. 14207

Dear Colonel Johnson:

1 I have received the copy of the Draft Detailed Project Report and Draft Environmental Impact Statement and associated Appendices, entitled "Conesus Lake, New York."

Although I have not had the opportunity to read the report as yet, I would like to thank you for supplying me with this copy which I intend to peruse in the very near future.

Very truly yours,

L. PAUL KEHOE
Member of Senate

STATE OF NEW YORK - THE SENATE (12 August 1981)
L. PAUL KEHOE - MEMBER OF SENATE

1. Your receipt of the draft report is acknowledged. No further response necessary.

STATE OF NEW YORK
DEPARTMENT OF AGRICULTURE AND MARKETS
J. ROGER BARBER, COMMISSIONER
ALBANY, NEW YORK 12235

August 17, 1981

Colonel George P. Johnson
District Engineer, Buffalo District
U.S. Army Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

RE: Conesus Lake, New York
Draft, Stage III Detailed Project
Report and Environmental Impact
Statement, July 1981

Dear Colonel Johnson:

The Draft Stage III Detailed Project Report and Environmental Impact Statement for Conesus Lake outlet has been reviewed. At the outset of the draft document, a reasonably sound project objective is proposed, i.e. "The District Engineer finds a need for the construction of a flood damage reduction project onthe Conesus Lake Outlet (Conesus Creek)."

From the examination of the draft, there exist several points of immediate as well as long-range concern to Agriculture and Markets. For the most part, the concerns of our department can be divided among such impact-categories as: socio-economic, and environmental -- primarily from the standpoint of agriculture.

1 We recognize the fact that other socio-economic and environmental concerns, outside of agriculture (e.g. sports fishing and fishery habitats, etc.) may require further development beyond the present draft. Nevertheless, once the agricultural concerns which we identify in this letter/addendum are properly addressed and fulfilled by and/or through the Corps of Engineers, they will help strengthen the proposed project document and lend to the efficient initiation and completion of the overall objective.

Sincerely,

John Lacey
Rural Development Specialist III

kjr
Attachment-Addendum
cc: Edward Miller - NYSDEC Regulatory Affairs
Henry Stamatel - USDA Soil Conservation Service
Charles Zernentsch - U.S. Army Corps of Engineers

STATE OF NEW YORK - DEPARTMENT OF AGRICULTURE AND MARKETS (17 August 1981)

1. Thank you for your review and comments. Your comments will be considered in detail in the finalization of the project detailed plans and specifications.

Note: Although not emphasized in the draft report documentation, potential impacts to agriculture (including prime and unique farmlands) and displacement of farms were given sufficiently important consideration in the assessment and development of alternative plans. As requested by the Corps North Central Division Office (Chicago) at a planning checkpoint conference (September 1980), a detailed working assessment was prepared and forwarded to them. This included a more detailed assessment of possible impacts to agriculture, including prime and unique farmlands (soils) and/or displacement of farms. For similar documentation, see the Addendum added to the Final Detailed Project Report, and Final EIS document entitled "Preliminary Assessment of Proposal Impacts on Land Use and Agriculture and Displacement of Farms" added to Appendix E. Some of the considerations and analysis given to agriculture in the Corps study are as follows:

The New York State (NYS) Prime Farmland Map, the NYS Important Farmland Map, the Livingston County Soil Survey Report, and the Livingston County, New York - Prime Farmland Mapping Units, were utilized as primary references in investigating potential impacts to prime and unique farmlands and soils. The Important Farmland Map and the Prime Farmland Map - both of which are used by the Corps in assessing project impacts - provide a broad view of lands that potentially may contain such soils. However, the Buffalo District further checks for such soils more specifically at the local, county, or town level by consulting published soil survey reports, and through use of prime and important farmland soil type lists identified and prepared by the U. S. Soil Conservation Service. As new information relative to prime and important farmlands becomes available, the U. S. Soil Conservation Service has been keeping the Buffalo District advised relative to current maps prepared, and they have been sending us copies of such maps by county. Other information resources, including Livingston County Planning Board planning documents (Land Use and Analysis, Soil Survey, Agricultural District maps, etc.) and the town of Livonia Land Use Map were also utilized.

The actual modification to the Conesus Creek outlet in the reach between the Route 20A Bridge and the Route 256 Bridge (Millville Dam) would consist of increasing the existing channel bottom width (already about 25 feet wide) to a 35-foot channel bottom width with 1 vertical to 3 horizontal side slopes. The actual area of stream modification, therefore, would consist of a strip of land about 15 to 20 feet wide and 5,000 feet long along the west bank. An additional 5 to 10 feet of permanent easement would be maintained along the improved bank to provide access for maintenance. The material excavated would be graded and seeded within a proposed 25-foot corridor along the improved west bank in compliance with easement and property owner agreements. Exisitng or man-made land drainage systems along the outlet creek would be maintained. Utilization of this corridor would be temporary. Only the permanent easement corridor (5 to 10 feet wide) along the creek bank would be permanent.

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Colonel George P. Johnson
District Engineer, Buffalo District

ADDENDUM

CONCERNS TO BE ADDRESSED
DRAFT, STAGE III DETAILED PROJECT REPORT AND
ENVIRONMENTAL IMPACT STATEMENT, JULY 1981

I. BACKGROUND re CONCERNS

Federal:

1) The July, 1981 draft document, on page EIS-69, Section 5.14 states:

> Analysis of Impacts on Prime and Unique Farmlands, CEQ *Memorandum, 30 August 1976. This memorandum requires that* an analysis be made of the effects of a proposed plan on prime and unique farmlands be made in an EIS. The preferred plans for Conesus Lake do not significantly affect
> 2 prime and unique farmlands in any manner although such farmlands are present in the general Conesus Lake vicinity, and this memorandum is complied with for the study.

The draft EIS's specific coverage of agriculture in relation to the project proposal is basically limited to the above quote. Subsequent to CEQ's Memorandum of 30 August 1976, was their Memorandum for Heads of Agencies, August 11, 1980. Relative to NEPA regulations (40 C.F.R. 1500-1508, Nov. 28, 1978) the memorandum states:

> ....These resource requirements include prime or unique agricultural lands. The effects to be studied encompass indirect effects that may include "growth inducing effects and other effects related to induced changes in the pattern of land use"... (Sec 1508.8(b)). The cumulative effects of a proposal must be studied (Secs. 1508.7, 1508.8(b)), as must any mitigation measures that could be taken to lessen the impact on prime or unique agricultural lands (Secs. 1505.2(c), 1508.20). Agencies must also cooperate with state or local governments in their efforts to help retain these lands. (Secs. 1502.16(c), 1506.2(d)).

State and Local:

3 1) *The State Constitution as amended* in 1969 Article 14, Section 4, declares as the policy of the state to:

STATE OF NEW YORK - DEPARTMENT OF AGRICULTURE AND MARKETS (17 August 1981)
CONTINUED

Utilizing the reference materials, cited previously, in relation to the alternative proposal, it was determined that no prime and unique farmlands (soils) would be significantly affected by the minor modifications to the Conesus Creek outlet. It is noteworthy to mention that some soil areas identified as prime farmland units are occupied by the outlet trailer park, homes/businesses, and the Lakeville Sewage Disposal Plant. In addition, *several thousand feet in the vicinity of the west bank has been previously* disturbed by the installation of the sewer line. The sketch (reference Figure B-4) also indicates that only about 1,000 feet of active agicultural land closely parallels the creek in the construction vicinity.

2. The statement in the July 1981 draft document, on page EIS-69, Section 5.14 was included to note that important consideration was given to the memorandum, but that the minor modifications along the Conesus Creek Outlet were determined to have no significant impacts in that respect. Since there *were no significant* impacts identified, this aspect was not emphasized in the report. Note: Sections pertaining to land use and land acquisition requirements, procedures, and guidelines, (EIS pages 21, 23, and 24) pertain to agricultural lands also.

Although the report indicates that the immediate outlet vicinity (from the lake to the 20A Bridge) as well as the lake perimeter is subject to increased developmental pressures (possibly only slightly as a result of the proposed project), this should not significantly affect agricultural land use in these immediate areas, since such areas have already been disturbed and are fairly well developed. The minor modifications and easements along the west bank of the Conesus Lake outlet between the Route 20A Bridge and the Route 256 Bridge *would not significantly change the land use in the vicinity.* Any minor mitigation measures would be incorporated in accordance with the usual land acquisition procedures, agreements, and guidelines.

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...conserve and protect agricultural lands as valued natural and ecological resources...and encourage the development and improvement of its lands for the production of food and other agricultural products... The legislature, in implementing this policy, should include for adequate provision for...the protection of agricultural lands.

2) Article 25AA, of the Agriculture and Markets Law reaffirms the (above) state policy through the local-state process of the formation of Agricultural Districts. The "Agricultural Districts Law" was enacted in 1971. Since that time, local agricultural districts have been formed throughout the state. Furthermore, the law's requirements for the review of local districts, eight years after their creation (and each eight years thereafter), is being continually implemented at local and state levels. Co-related with CEQ's memorandum (i.e. NEPA: "Agencies must also cooperate with state or local governments in their efforts to help retain these lands"), it is the policy of New York State agencies to: "...encourage the maintenance of viable farming in agricultural districts..." (Article 25AA, Section 305.3).

3) Recently (1980) legislation was enacted which established a land classification system pursuant to Article 25AA of the Agriculture and Markets Law, Section 370. As of 1981, the land classification system includes the technical ranking of the soils types throughout the counties of the state. It categorizes the soil types by agricultural groupings, i.e. ten agricultural soil groups, according to agricultural productivity and agricultural capability. Those soils ranked in soil group number-ten have the bottom rating. Among the various applications of the land classification system is its service as a means for the Department of Agriculture and Markets, (in conjunction with other local, state and federal units of government) to conduct its responsibility for the State... "conserve and protect agricultural lands..." (Article 14, Section 4, State Constitution), both inside and outside of agricultural districts. The land classification system provides a technically based means of evaluating various proposals when the potential exists for interface with agricultural land.

II. ADDITIONAL FACTS

Certain matters are omitted from the components of the present document. The following notes are provided to you for improving/strengthening the draft document:

1) Agricultural land interpretations

(Ref: Appendix B, Economics) Regarding agriculture, the watershed land use map for Conesus Lake provides designations for: active farmland and

STATE OF NEW YORK - DEPARTMENT OF AGRICULTURE AND MARKETS (17 August 1981)

CONTINUED

3. In New York State, the NYS Department of Environmental Conservation is by law the non-Federal sponsor on all Federal flood control projects. They are the primary State agency through which the Corps of Engineers coordinates their studies and projects. In addition, the Corps coordinates with many other Federal, State, and local agencies, as well as with the public having potential interest in the project, whereby they are encouraged to provide any pertinent information and comment on the project. (Reference page EIS-71) Agricultural interests are one facet of the many interests involved. Consideration is given to Federal, State, and local policies when applicable.

4. The AFFECTED AREA section of APPENDIX B - RESOURCES AND ECONOMY was prepared primarily for background/baseline information from primarily a regional aspect. The following FLOOD PLAIN CHARACTERISTICS section focuses more on the immediate problem and project vicinity. Figure B-4 was, therefore, located in this section of the appendix. It was identified as "a detailed land use map (based on the town of Livonia, Land Use Map) of the area in which channelization will occur on the outlet . . ." Note: Both Figures B-3 and B-4 are also referenced on page B-48 under the EXISTING ACTIVITIES section, as well as other sections of the report.

Reference Comment Response No. 1. Reference page EIS 41, 3.31a. Such information was identified and included in a detailed working assessment. This was not included in detail in the draft documentation, however, because no significant or extraordinary impacts were identified with respect to agriculture or displacement of farms as a result of the project.

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4 inactive farmland. Not represented on the watershed map is the land use for the segment of proposed project area immediately outside of (downstream from) the watershed, i.e. Conesus Creek. Parcels along the west side of the Conesus Creek (proposed for project activity) are in active agriculture. While this fact may be supposed on page B-40 (Conesus Lake Outlet Land Use) the map is within the section titled: "Floodplain Characteristics," it is not directly correlated into the document's description of agriculture and land use. Representation of this area is necessary, in direct association with the respective segments, i.e. agriculture and land use.

Furthermore, while the document (page B-27) states: "The County contains vast areas of prime farmland especially in the upland areas surrounding Conesus Lake, most of which has been in productive use;" it does not reflect the relative significance of such prime lands including lands in the project area as compared with the agricultural land resource base of the state. The Important Farmland Map of New York, 1979, compiled by Cornell University Agricultural Experiment Station for USDA Soil Conservation Service clearly shows that band of soils in and around the proposed project area is in the highest order of the mapped categories: "more than 75 percent prime farmland."

5 2) Agricultural land designation

(Ref: Appendix B, Economics) Regarding the formation of agricultural districts, the document (page B-32) states:

> The County has designated ten Agricultural Districts in accordance with New York State conservation efforts. The Agricultural Districts generally coincide with the areas of prime farmland.

Since the formation of the ten original agricultural districts within Livingston County, the eight-year review process has been and is being implemented. The dominant trend is three-fold: a consolidation of the number of agricultural districts; the retention of earlier, locally designated parcels in the new districts; and designation of previously excluded parcels into the districts.

6 3) Agricultural soils resource base

The draft document's EIS and Project Report components mention the presence of agricultural land (see 1 and 2 above), but do not note the relevant soil groups as found in the land classification system. The state's Land Classification System ranks all soils found within Livingston County (identified in the Livingston County Soil Survey) according to agricultural productivity and agricultural capability.

STATE OF NEW YORK - DEPARTMENT OF AGRICULTURE AND MARKETS (17 August 1981)

CONTINUED

5. Communication with Livingston County representatives indicated that two property parcels in the Conesus Creek outlet vicinity are included in two designated agricultural districts (2 and 13). This was not included in specific detail in the draft reports, however, because the extent of modification along the Conesus Creek outlet did not generate extensive impact concerns. This information was utilized primarily in preliminary assessment of proposals and will contribute toward proper procedures in land and easement acquisition.

6. The latest Livingston County Soil Survey Report (including the State's Land Classification System) and the County's Prime Farmland - Mapping Unit-Listing were utilized in preparing a working assessment. (Reference Response Comment No. 1) This was not included in the draft documentation because the minor modifications along the Conesus Creek outlet did not generate significant impact concerns.

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III. CONCERNS OF AGRICULTURE AND MARKETS

The following are the concerns of the Department of Agriculture and *Markets*, and require proper addressing for the improvement of the project above its presently submitted proposal *stage:*

1) Methods of implementation re: *obtaining lands and easements and providing* compensation

The draft document Detailed Project Report states (page 36):

> In New York State the NYSDEC is by law the non-Federal sponsor in all Federal flood control projects. They will enter into a contract with the Federal Government to provide all lands, easements and necessary *relocations* but they traditionally require the protected communities to provide the *necessary* maintenance and to relocate any *utilities* that belong to the local *community.*

Further, the draft document EIS states *(page* EIS-23):

> Therefore...local interests must furnish assurances to the Secretary of the Army that they will:
>
> (1) Provide without cost to the *United States*, all lands, easements, and rights-of-way necessary for construction and subsequent maintenance *of* the project works including necessary borrow and spoil areas.

The Army Corps of Engineers' draft document omits the method by which the provision...of all lands, *easements*, and rights-of-way...*will be accomplished*; *i.e.* from the agricultural economics *standpoint*, the document needs to detail the manner in which *compensation* is to be rendered to farmers for the interface *of any lands* with project *activity*; *e.g. temporary* loss of agricultural production for project-related entry and egress; permanent *loss of* agricultural land due to outlet-bank excavation/*shaping* and any permanent right-of-way.

The bases for these concerns as well *as those* which follow, on the part of the Department of *Agriculture* and Markets are: the *designation* of land in the *original* and since-consolidated agricultural *district* within *the immediate zone* of the outlet (Conesus Creek); and the presence of highly ranked soils (land classification system) both *within* and outside of the agricultural district *along the zone of the outlet as* well as adjacent with this zone. Examples of such soils are: Cazenovia, Galen, Elmridge-Schoharie, Ontario-Hilton and Schoharie.

STATE OF NEW YORK - DEPARTMENT OF AGRICULTURE AND MARKETS (17 August 1981) CONTINUED

7. The draft document *Detailed Project* Report (page 41) and the draft document *Environmental* Impact Statement (pages EIS-21, EIS-23, and EIS-24) also state (and incorporates by reference) that among other *assurances*, the local cooperator must: Comply with the *applicable provisions* of the uniform Relocation *Assistance and* Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved 2 January 1971, in acquiring *lands, easements*, and rights-of-way for construction and subsequent *maintenance* of the project, and inform affected *persons of pertinent* benefits, policies, and procedures in connection with *said* Act. The guidelines set forth by this legislation include compensation and mitigation procedures pertaining to acquisition of agricultural land.

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2) <u>Methods of preventing damage to agricultural operations and agricultural land</u>

The draft document Detailed Project Report (page 36) states:

> The channelization downstream of the 20A bridge will be accomplished by restricting excavating to the left (west) bank. This will leave the east bank for the most part untouched. This will minimize disruption to the residences on the east side of this channel, along with preserving most of the trees and vegetation.

The draft document EIS (page EIS-4) states:

> Since the preferred alternative would affect navigable waters of the United States as defined in the Federal Register (24 December 1980), Guidelines for Specification of Disposal Sites for Dredged or Fill Material, the required Section 404 Report has been prepared and included in Appendix E of the Detailed Project Report.

The draft document Detailed Project Report page E-2 includes:

8 <u>1.6 Description of the Proposed Discharge Site for Dredged or Fill Material</u>.

1.6.1 <u>Location and Areal Extent</u> - The areas of bank modification and filling along Conesus Creek will occur on the left and right banks (looking downstream) for a distance of approximately 650 feet upstream of the Route 20A bridge and primarily along the left bank for distance of about 5,000 feet downstream of the Route 20A bridge. Proposed modifications would result in channel widening, banks being graded to 1 on 3 slope, and some placement of riprap...

1.8 <u>Method of Discharge</u> - The actual methods of discharge will be determined at the time of construction. The proposed work would be performed by utilizing a backhoe and bulldozer. The bulldozer would be used to shape and slope the banks as well as spread and grade the stone. Stone would be trucked into the project site. The backhoe would be used to do channel modifications and dredging. Any material dredged from the creek will be deposited just upland on the left bank (west bank) and graded over a corridor 25 feet wide paralleling the bank.

1.9 <u>Timing of Discharge</u> - The actual year of project construction cannot be determined due to the time of OCE approval and availability of funding. However, the minimize impacts of dredging and discharges on the fishery and wildlife of the creek, an attempt will be made to limit to the summer session. Coordination with U.S. Fish and Wildlife Service (FWS) and New York State Department of Environmental Conservation (NYSDEC) will be maintained to identify any critical periods when there should be no construction.

<u>STATE OF NEW YORK - DEPARTMENT OF AGRICULTURE AND MARKETS</u> (17 August 1981)
CONTINUED

8. These sections, along with other corresponding or related sections and appendicies are specific enough to serve as intended. The Section 404 Evaluation is prepared primarily to determine potential effects of the discharge of dredged and fill material into waters of the United States, and to coordinate with publics that may have an interest in the project in that respect. The report is in accordance with Section 404(b), Guidelines of the Clean Water Act.

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8 1.10 Projected Life of the Discharge Site - The construction of the new channel, control structure, and placement of concrete, riprap, and bedding stone fill material will be a one-time occurrence - except for occasional maintenance. These discharges and the use of the sites will occur only at the time of construction and is designed for a 50-year life. Any material removed during the operation and maintenance portion of the project will become the property and responsibility of the local cooperator (NYSDEC).

The draft document needs *to specify* the safeguards that will be applied throughout the various stages of modification of the bank(s) dredging or filling along Conesus Creek, *downstream* of the Route 20A bridge.

These specific clarifications re safeguards are needed now rather than "be determined at the time of construction."

The Army Corps of Engineers needs, in its EIS and Detailed Project Report, to assure that throughout the actual project construction and thereafter:

9

1) No impedement will be created which will hinder expedient drainage of surface waters via natural or artifical systems on agricultural lands which interface with the project zone;

2) No impedement will be created which will result in the disservice of existing *sub-surface drainage lines*; and

3) Any *depositing of soil from* bank modifications and dredgings on agricultural land will be done in such a manner as to improve *the managability* of the land for farming (e.g. soils for disposal shall be drained prior to placement in various depressions or other locations on agricultural lands as indicated by respective landowners/operators.

STATE OF NEW YORK - DEPARTMENT OF AGRICULTURE AND MARKETS (17 August 1981)

CONTINUED

9. Construction activities cannot proceed until required land and easement agreements are *established* and plans and specifications are finalized. These are developed in specific *detail* after review of the draft and final planning documents when selection of an alternative plan is determined. Specifics cannot realistically be determined until a basic plan has been selected, and negotiations (property, easements, concerns) conducted. These specifics are then incorporated into the final detailed plans and specifications.

The phrase, "be determined at the time of construction," *refers* to the array of *options*/methods (all acceptable) that the Contractor could use to discharge the material. This generally depends on the Contractor selected, equipment available, specification determinations, etc.

The items of expressed concern are given consideration in negotiations for acquisition of land and easements and in development of final plans and specifications. In addition, applicable environmental safeguards in Corps of Engineers Civil Works Construction Guide Specification for Environmental Protection (CW-01430, dated July 1978) would be followed during construction.

a. With respect to - *impediments* which might hinder expedient drainage of surface waters via natural or artificial systems on agricultural lands which interface the project zone - a primary concern (for this and most any project) pertains to the effects of variations in discharge and water levels. Hydrological and hydraulic investigations show, however, that the effect (particularly considering the *scale of the project*) would *not* be significant. Provision for preventing blockage of the aforementioned systems would be considered *and* developed during preparation of final plans and specifications in project planning.

b. Consideration is given in preparation of *final plans and specifications* so that no impediment would be created which would result in the disservice of existing subsurface drainage *lines* (i.e., tile lines, etc.).

c. Any depositing of soil from *bank modifications* and dredgings on agricultural lands would be done in such a manner as to retain natural or existing drainage characteristics, and in a manner as agreed upon/indicated by the respective land owners/operators. This would be determined in negotiations for land and easements and in development of final plans and specifications. Disturbed bank soils would be promptly fertilized, seeded and mulched to reduce potential erosion.

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